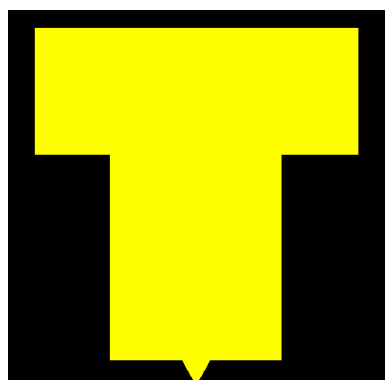
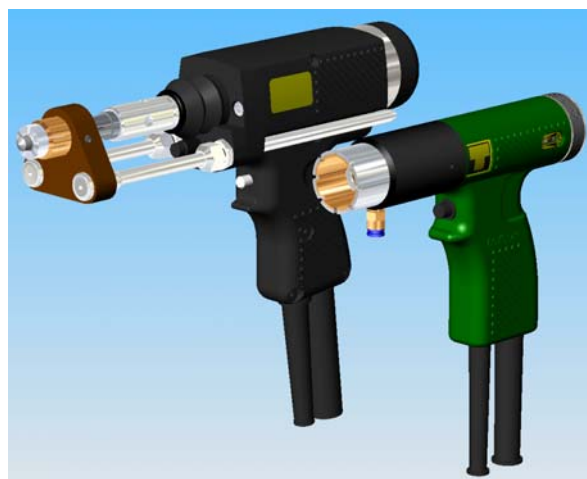


TAYLOR STUDWELDING SYSTEMS LIMITED.

OPERATING MANUAL
FOR
1200E
DRAWN ARC STUDWELDING
EQUIPMENT RANGE



TAYLOR
STUDWELDING
SYSTEMS LIMITED



INDEX

<u>PAGE No.</u>	<u>CONTENT.</u>
3	General Information.
5	Introduction.
6	Equipment Schedule.
7	External Features.
10	Safety.
13	Setting Up & Welding.
22	Weld Settings.
23	Visual Weld Inspection.
25	Weld Testing.
27	Studwelding Techniques.
31	Controller Explosion.
36	Pistol Explosion (DA2).
43	Accessories (DA2).
45	Pistol Explosion (DA8).
51	Accessories (DA8).
54	Circuit Schematics
58	EC Declaration of Conformity.



GENERAL INFORMATION

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PURPOSE AND CONTENT OF THIS MANUAL

This manual has been written for :

- ☞ The operator of the welding machine.
- ☞ The personnel of the final customer responsible for the installation and operation of the machine.

This manual contains information on :

- ☞ Installation and connection
- ☞ Operation.
- ☞ Technical data.
- ☞ Spare parts.
- ☞ Accessories.

GENERAL INFORMATION

FURTHER INFORMATION

Should you require additional technical information, please contact us directly (details on page 1) or our local agent / distributor (details of agents etc. can be obtained from us).

This manual contains important information which is a pre-requisite for safe operation of the equipment. The operating personnel must be able to consult this manual. In the interests of safety, make this manual available to your personnel in good time.

If the equipment is sold / passed on, please hand over this manual to the new owner. Please immediately inform us of the name and address of the new owner, in case we need to contact him regarding the safety of the machine.



Please read this manual carefully before installation of the machine.



Please especially observe the safety instructions.

INTRODUCTION

INTRODUCTION.

Taylor Studwelding 1200DA Drawn Arc systems are stud welding systems that are intended for precision stud welding up to 20 mm diameter reduced base studs. The systems are easily transportable and have been designed to operate with a minimum amount of maintenance.

The pistols are modern, ergonomically designed and offer maximum comfort in handling with minimum operator fatigue.

The complete systems consists of a control unit, a welding pistol and the necessary interconnecting cables and accessories.

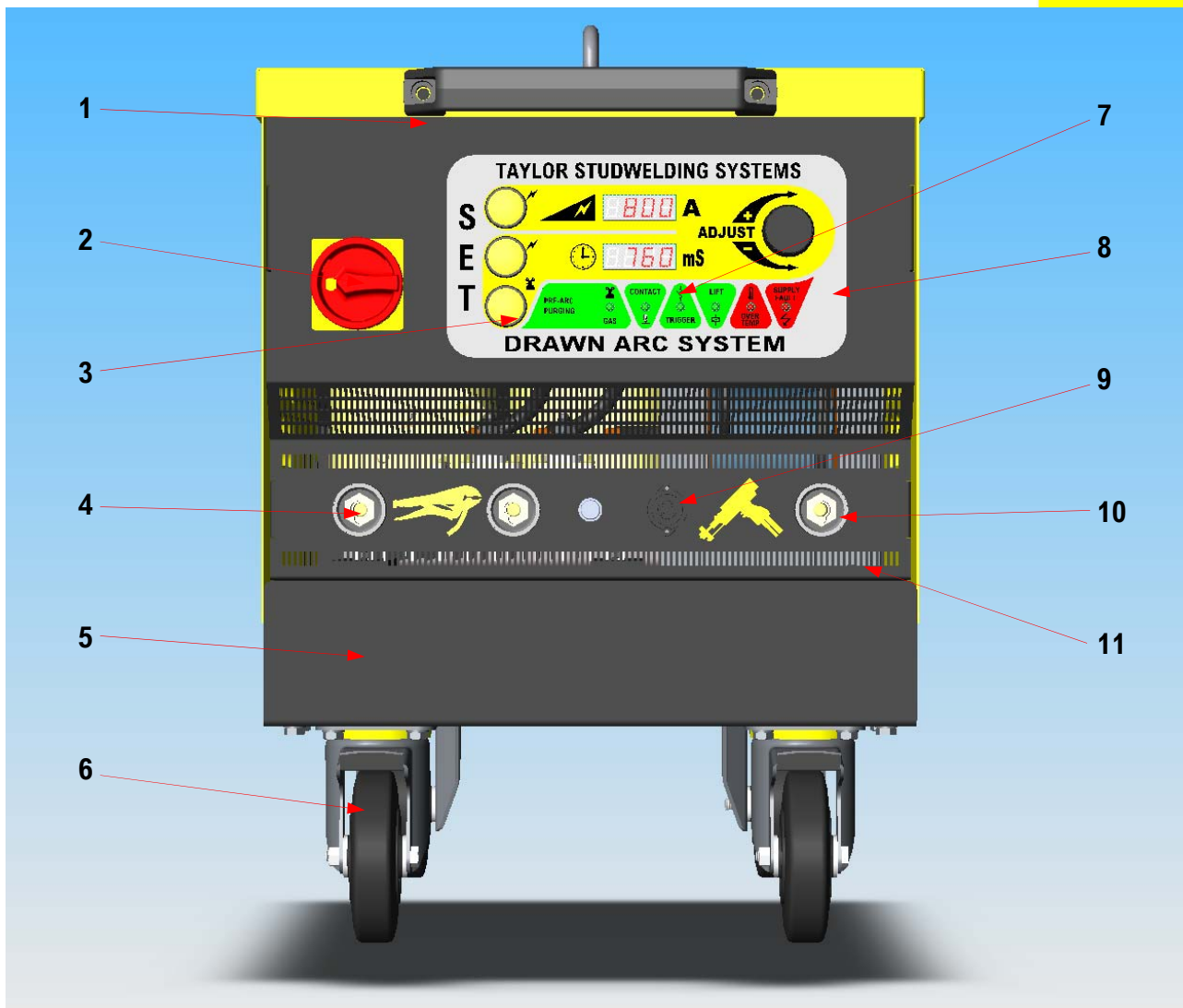
THE PROCESS.

The Drawn Arc process is a long established, well proven method of stud welding. The pistol lifts the stud to be welded away from the work piece, simultaneously striking an arc between the two. This causes both the stud and the work piece to melt. After the pre-selected weld time has elapsed, the pistol returns the stud to the molten pool on the work piece, thus forming the weld. The energy required to perform the weld is derived from a transformer - rectifier in the control unit.

EQUIPMENT SCHEDULE

1. **SYSTEM CONTROL UNIT.**
2. **PISTOL ASSEMBLY, COMPRISING :-**
 - a. **THE PISTOL.**
 - b. **ONE SET OF ADJUSTABLE LEGS.**
 - c. **ONE SET OF ADJUSTABLE LEG WASHERS AND SCREWS.**
3. **EARTH CABLE , COMPRISING :-**
 - a. **TWO OFF, 5m CABLE ASSEMBLY.**
 - b. **TWO OFF, LARGE SELF-GRIP CLAMP.**
4. **TOOLS, COMPRISING :-**
 - a. **ONE OFF METRIC ALLEN KEY SET.**
 - b. **ONE OFF, 15 mm SPANNER.**
 - c. **ONE OFF, CHUCK EJECTOR TOOL.**
5. **EQUIPMENT OPERATING MANUAL.**
6. **ACCESSORIES PROVIDED :-**
 - a. **TWO OFF, STANDARD CHUCKS.**
 - b. **TWO OFF STANDARD FERRULE GRIPS.**
7. **ACCESSORIES - OPTIONAL EXTRAS :-**
 - a. **STANDARD CHUCKS, RANGE 3 mm TO 20 mm.**
 - b. **STANDARD FERRULE GRIPS, RANGE 3 mm TO 20 mm.**
8. **CABLES - OPTIONAL EXTRAS :-**
 - a. **5m PISTOL EXTENSION CABLES.**
 - b. **5m EARTH EXTENSION CABLES.**

EXTERNAL FEATURES



FRONT PANEL

1. GUIDING HANDLE **! NOT FOR LIFTING !**
2. MAINS ON/OFF SWITCH
3. MAINS ON INDICATOR
4. WELDING EARTH SOCKET
5. OPTIONAL/REMOVABLE FRONT CASTOR PLATE
6. FRONT CASTOR (SWIVEL & BRAKE)
7. WELDING TIME ADJUSTOR KNOB
8. WELDING CURRENT ADJUSTOR SWITCH
9. WELDING PISTOL CONTROL SOCKET
10. WELDING PISTOL SOCKET

EXTERNAL FEATURES



1. LIFTING EYEBOLT
2. VENTILLATION LOUVRES **! DO NOT OBSTRUCT !**
3. FORKLIFT /
SLINGLIFT POINTS.

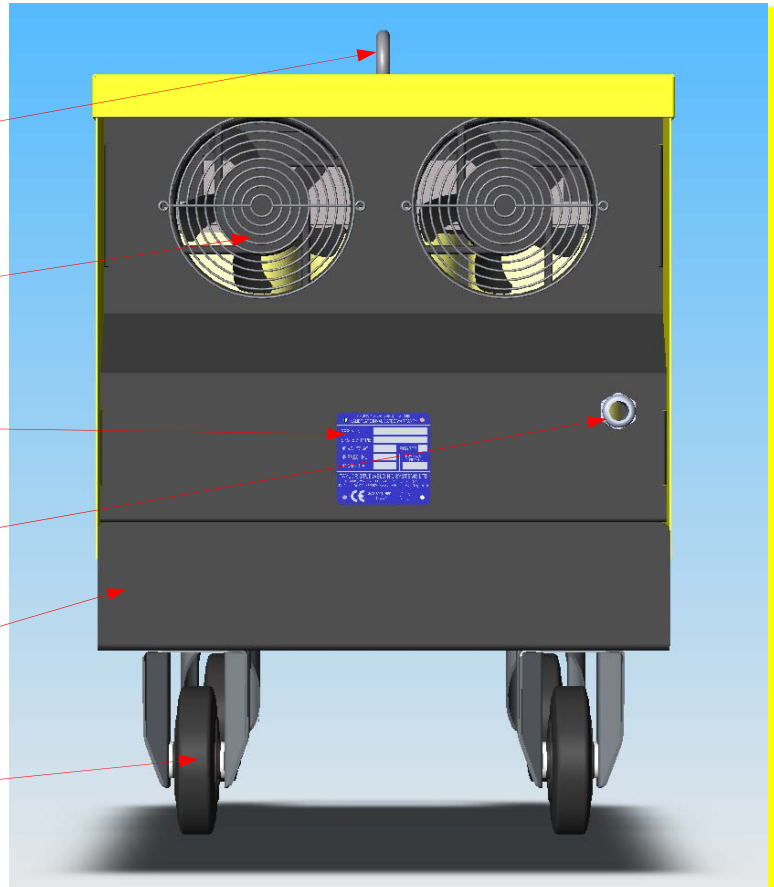
**VIEW
SHOWING
CASTOR PLATES
REMOVED**



EXTERNAL FEATURES

BACK PANEL

1. LIFTING EYEBOLT
2. VENTILLATION GRILLES.
! DO NOT OBSTRUCT !
3. RATING/SERIAL PLATE.
4. 3 Ph SUPPLY CABLE INLET.
5. OPTIONAL/REMOVABLE
REAR CASTOR PLATE.
6. REAR WHEELS (FIXED).



IMPORTANT NOTES !



Due to the power requirements and Electromagnetic emissions produced during normal use, this machine must only be operated in an industrial environment.



This machine operates from a mains supply of 400V AC 50/60 Hz.



Never obstruct the rear panel and underside ventilation grilles or the side panel louvers as this may cause the unit to overheat during operation.



Never remove any portion of the unit housing without first isolating the unit from the mains electrical supply.

SAFETY

PROTECT YOURSELF AND OTHERS !

Read and understand these safety notices.

1. ELECTRICAL

No portion of the outer cover of the welding controller should be removed by anyone other than suitably qualified personnel and never whilst mains power is connected. **ALWAYS** disconnect the mains plug from the socket.



RISK TO LIFE!!!

DO NOT use any fluids to clean electrical components as these may penetrate into the electrical system.

Installation must be according to the setting up procedure detailed on page 10 of this manual and must be in line with national, regional and local safety codes.

2. FIRE

During welding small particles of very hot metal are expelled. Ensure that no combustible materials can be ignited by these.

SAFETY

3. PERSONNEL SAFETY

Arc rays can burn your eyes and skin and noise can damage your hearing. Operators and personnel working in close proximity must wear suitable eye, ear and body protection.

Fumes and gases can seriously harm your health. Use the equipment only in a suitably ventilated area. If ventilation is inadequate, then appropriate fume extraction equipment must be used.

Hot metal spatter can cause fire and burns. Appropriate clothing must be worn. Clothing made from or soiled with, combustible materials must NOT be worn.

Have a fire extinguisher nearby and know how to use it.

Magnetic fields from high currents can affect heart pacemakers or other electronically controlled medical devices. It is imperative that all personnel likely to come into the vicinity of any welding plant are warned of the possible RISK TO LIFE before entering the area.

4. MAINTENANCE

All cables must be inspected regularly to ensure that no danger exists from worn or damaged insulation or from unsound electrical connections. Special note should be made of the cables close to the pistol, where maximum wear occurs. As well as producing inconsistent welds, worn cables can overheat or spark, giving rise to the risk of fire.

5. TRAINING

Use of the equipment must be limited to authorised personnel only who must be suitably trained and must have read and understood this manual. This manual must be made available to all operators at all times. Further copies of this manual may be purchased from the manufacturer. Measures must be taken to prevent the use of this equipment by unauthorised personnel.

SAFETY

6. INSTALLATION

Ensure that the site chosen for the equipment is able to support the weight of the equipment and that it will not fall or cause a danger in the course of its normal operation. Do not hang connecting cables over sharp edges and do not install connecting cables near heat sources or via traffic routes where people may trip over them or they may be damaged by the passage of vehicles (forklifts etc).

7. INTERFERENCE

During welding operations, intense magnetic and electrical fields are unavoidably produced and these may interfere with other sensitive Electronic equipment.

As previously mentioned, all personnel wearing heart pacemakers or other electronically controlled medical devices must be kept well away from any welding operations.

The welding equipment should be installed at least 5 metres away from any computer equipment to minimise any possible interaction. Note that cables carrying signals between electronic devices are also capable of picking up interference which may modify the way in which those devices function and therefore should be sited outside the 5 metre zone.

Do not place objects which are sensitive to magnetism near the welding area, wristwatches, credit cards, computer disks etc. will all be rendered useless.

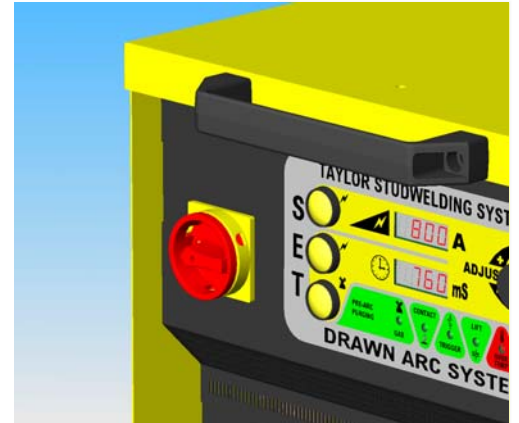
The welding equipment, like all other welding equipment, is itself electronically sensitive and its position relative to other radiation emitting equipment (mobile phones, remote controls, motor speed controllers etc.) must be considered.

8. DISPOSAL

The equipment either wholly or any of its component parts may be disposed of as part of general industrial waste or passed to a scrap merchant. Non of the components used in the manufacture are toxic, carcinogenic or harmful to health.

SETTING UP & WELDING

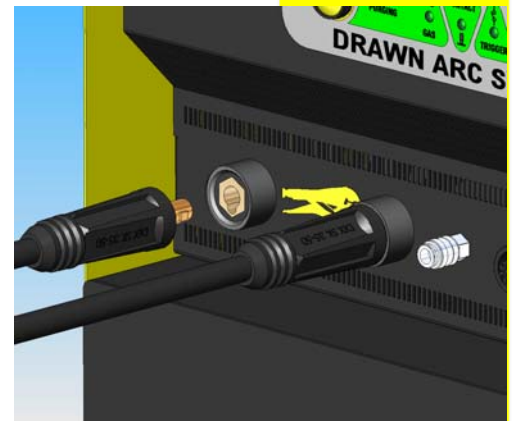
Set up the control unit at the place of work, ensuring that the mains switch is in the OFF position.



Plug the controller into a suitable three phase 400 V AC supply with a 63A motor rated fuse/breaker.



Plug the welding earth cables into the controller. Note that the cable end weld plug has a peg which mates with the key slot in the panel mounted socket.



IMPORTANT! Secure the connectors with a clockwise turn until they lock. Failure to do this may result in damage to the connectors during welding.

Attach the welding earth clamps to the work piece at approximately 180° to each other; this will help prevent "arc-blow" when welding takes place. Prior to fitting the clamps, ensure that the contact area of the work piece is free from rust, paint, grease etc., as this will result in a poor welding connection.



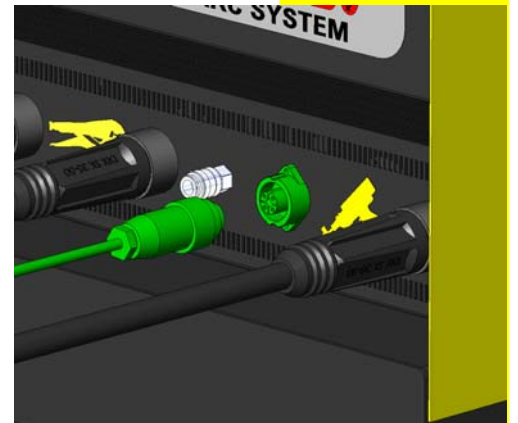
SETTING UP & WELDING

Plug the welding pistol cable into the controller. Note that the cable end weld plug has a peg which mates with the key slot in the panel mounted socket.

IMPORTANT! Secure the connectors with a clockwise turn until they lock. Failure to do this may result in damage to the connectors during welding.



Plug the pistol control cable into the controller. Note that the cable end plug and panel-mounting socket are keyed to prevent incorrect fitting. Push the plug firmly home and twist the locking ring to secure the plug in position.

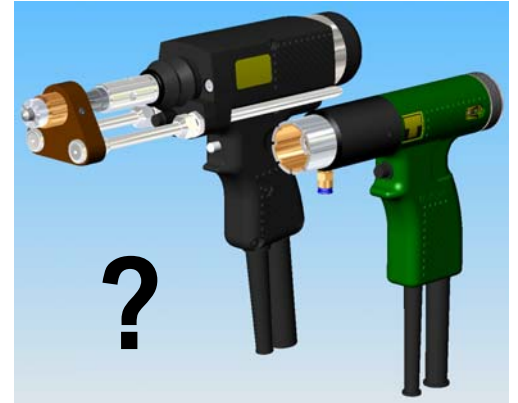


Select the required weld stud, on the basis of process, diameter, length and material.

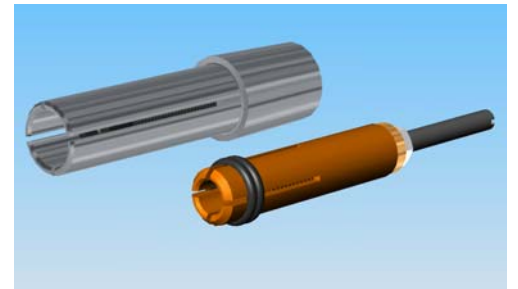


SETTING UP & WELDING

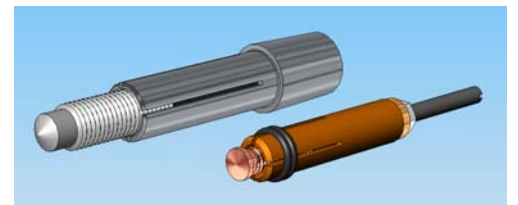
Regardless of the type of pistol you are using the general principles for the setting of the pistol are basically the same. The following pages will act as a guide to the specifics of pistol setting.



Select the required chuck to suit the pistol you are using (DA2 or DA8) and for the chosen weld stud. Note that the DA2 pistol will accept European screw-on chucks as well as the standard English Morse taper types.



Adjust the chuck to suit the stud you are planning to weld. The adjustment criteria for a standard chuck when welding using ceramic ferrules is to leave enough of the stud protruding from the chuck to pass through the thickness of the ferrule plus the required amount of protrusion (burn-off allowance, see page 22) plus a minimum of 1 mm to avoid the chuck hitting the ferrule. When welding using inert gas shielding a minimum of the protrusion plus 1 mm should be left.



Please note. These are minimum requirements to ensure correct welding takes place. Wherever possible we recommend adjusting the chuck with more than the minimum requirement protruding.

From this point it is easier to go over the setting of each type of pistol separately.

SETTING UP & WELDING

SETTING UP THE DA2 PISTOL

Having set the chuck. Fit it into the pistol, this is achieved by lightly tapping the chuck into the Morse taper adaptor on the pistol.

NOTE! This pistol can accept European screw-on chucks. This is achieved by first removing the Morse taper adaptor from the pistol shaft.

Next, select and fit the desired foot arrangement. The illustration shows the standard foot for welding using ceramic ferrules (an alternative foot arrangement for inert gas shielding is also available, see the accessories section of this manual).

When welding with ferrules, the appropriate brass ferrule grip for the diameter of stud being welded will need to be fitted to the foot adaptor.

Insert the selected Drawn Arc stud into the chuck and, if welding using ferrules, the appropriate ferrule into the brass grip. Temporarily lock the pistol legs using the leg locking nuts on the pistol front end cap and centre the foot arrangement by loosening the two foot screws and moving the foot adaptor until the stud is centred in the ferrule/nose cone.

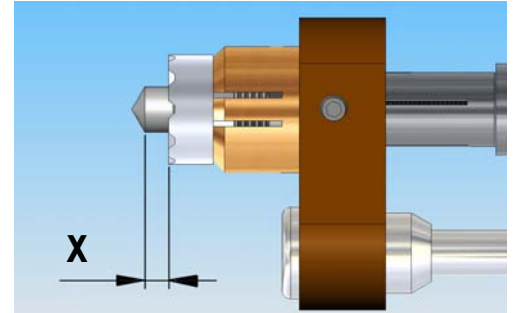
NOTE! Improper welds will result if there is any binding between the stud and ferrule.



SETTING UP & WELDING

SETTING UP THE DA2 PISTOL

Set the desired protrusion by loosening the leg locking nuts and sliding the leg assembly until the desired amount of stud protrusion for the chosen weld stud is achieved. The stud protrusion dimension is shown as dimension “X” in the accompanying illustration and refers to the amount of stud protruding beyond the ferrule or gas nose cone.

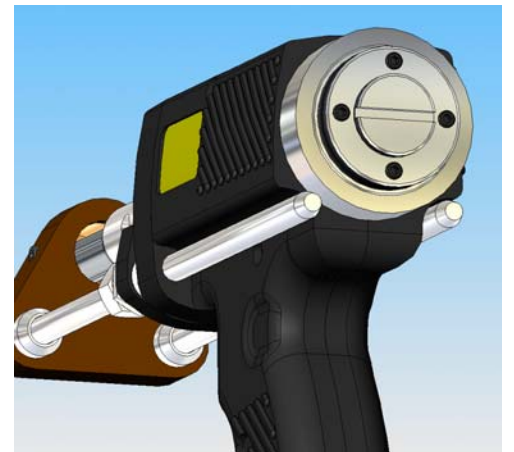


A suggested range of settings can be found on the weld settings page (22) of this manual.

NOTE! It is necessary to reset the protrusion when changing stud lengths / diameters.

If necessary, adjust the pistol lift. This is achieved by removing the rear end cap. Underneath the end cap is a click-stop adjuster, with a slot for coin adjustment. To increase pistol lift turn the adjuster anti-clockwise, each click of the adjuster represents an increase of 0.25 mm. Reduction of lift is achieved by turning the adjuster clockwise.

To determine the amount of lift set on the pistol :- Set the time to its maximum setting, then pull the trigger with the pistol away from the work piece and measure the lift.



SETTING UP & WELDING

SETTING UP THE DA8 PISTOL

Having set the chuck. Fit it into the pistol, this is achieved by inserting the chuck into the pistol and pushing it firmly home until it comes to a stop.

Tighten the chuck locking nut with the box key provided.

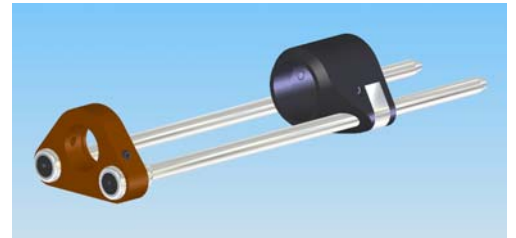
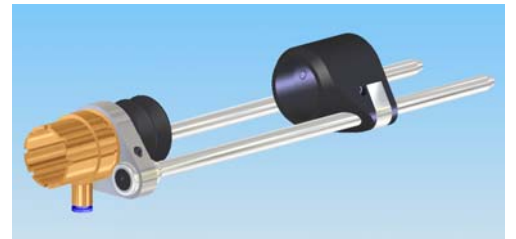
NOTE! A gentle pressure is all that is required. Overtightening may result in damage to your pistol.

Next, select and fit the desired foot arrangement. The standard arrangement for a DA8 pistol is the fixed length one-piece gas nose cone. However, alternative adjustable leg assemblies are available for welding with either inert gas shielding or ceramic ferrules, should the application demand it (see pages 42 - 44 for these accessories).

When welding with ferrules, the appropriate brass ferrule grip for the diameter of stud being welded will need to be fitted to the foot adaptor.

Insert the selected Drawn Arc stud into the chuck and, if welding using ferrules, the appropriate ferrule into the brass grip. Temporarily lock the pistol legs using the leg locking inserts in the pistol front end cap and centre the foot arrangement by loosening the two foot screws and moving the foot adaptor until the stud is centred in the ferrule/nose cone.

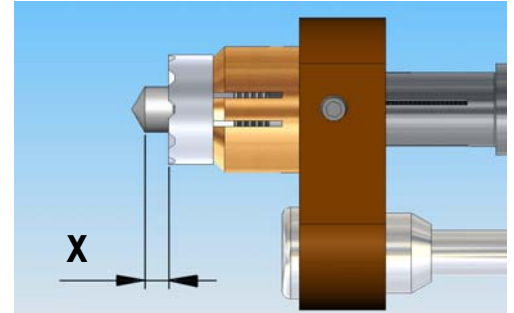
NOTE! Improper welds will result if there is any binding between the stud and ferrule.



SETTING UP & WELDING

SETTING UP THE DA8 PISTOL

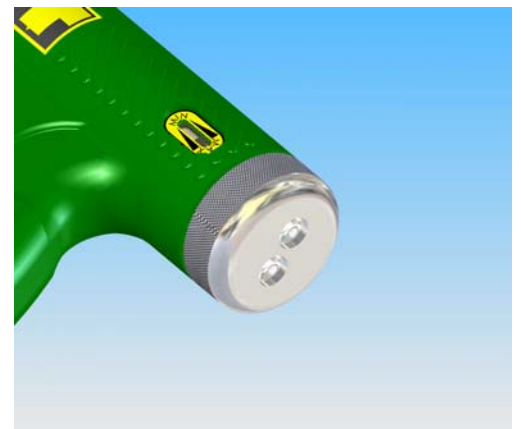
Set the desired protrusion by loosening the leg locking inserts and sliding the leg assembly until the desired amount of stud protrusion for the chosen weld stud is achieved. The stud protrusion dimension is shown as dimension “X” in the accompanying illustration and refers to the amount of stud protruding beyond the ferrule or gas nose cone.



A suggested range of settings can be found on the weld settings page (22) of this manual.

NOTE! It is necessary to reset the protrusion when changing stud lengths / diameters.

If necessary, adjust the pistol lift by twisting the rear end cap of the pistol. Turning the end cap clockwise reduces the lift, conversely turning the cap anti-clockwise increases the lift.



To properly adjust the lift, you must firstly reset the pistol lift to zero. This is achieved by increasing the lift to the maximum setting and placing the pistol in the welding position against a flat surface. This will push the tip of the weld stud back until it is level with the leading edge of the nose cone/ferrule (taking up the protrusion). With the pistol held firmly in this position gently twist the rear end cap adjuster clockwise until the motion becomes stiff. Further adjustment at this point should try to push the weld stud out, forcing the nose cone/ferrule away from the plate. This is the zero lift point.

To set the desired lift, turn the rear end cap anti-clockwise, counting clicks on the adjuster detent. One click is equal to 0.25 mm of lift. Therefore a desired lift of 3 mm equates to 12 clicks.

SETTING UP & WELDING

Switch the controller ON by turning the mains switch clockwise through 45°. The power on indicator will light and the ventilation fans will start.

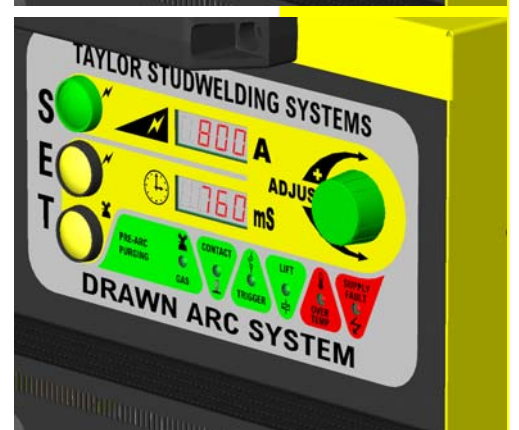
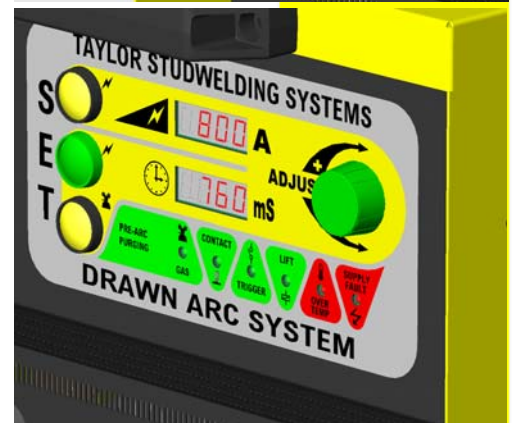
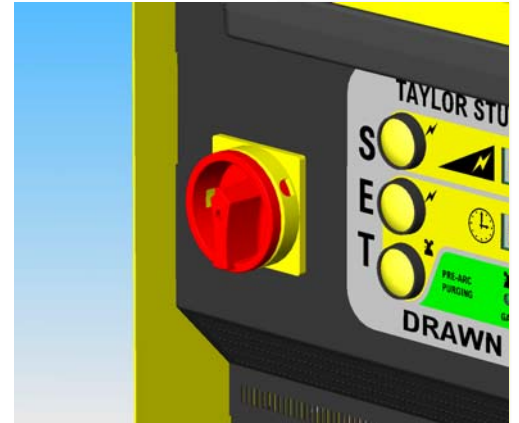
To set the weld time, press and hold the time setting button and turn the adjuster knob until the display indicates the desired time in milliseconds.

For a guide to what settings to use see page 18 of this manual.

Please note that the desired pre-arc gas purge is set in the same way using the lower button. The purge time is displayed in the weld time window.

To set the weld current, press and hold the current setting button and turn the adjuster knob until the display indicates the desired current in Amps.

Again for a guide to what settings to use see page 18 of this manual.



SETTING UP & WELDING

Place the pistol perpendicular to the work piece with the stud touching down at the desired location to be welded. Press down on the pistol until the ceramic ferrule rests firmly on the work piece. Press the trigger to initiate the weld sequence.

See the section on Studwelding Techniques for further advice.

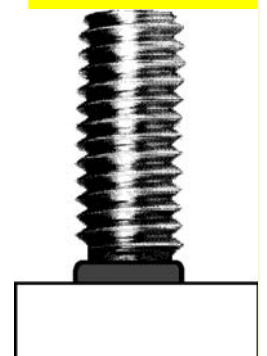
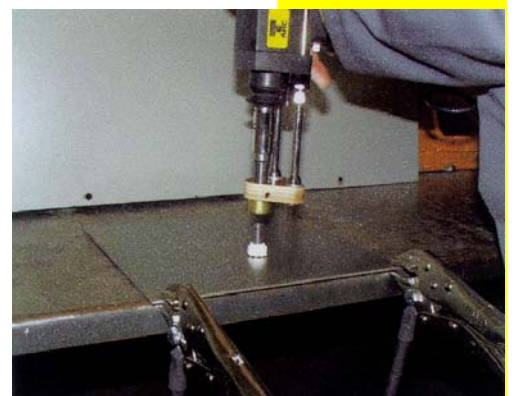
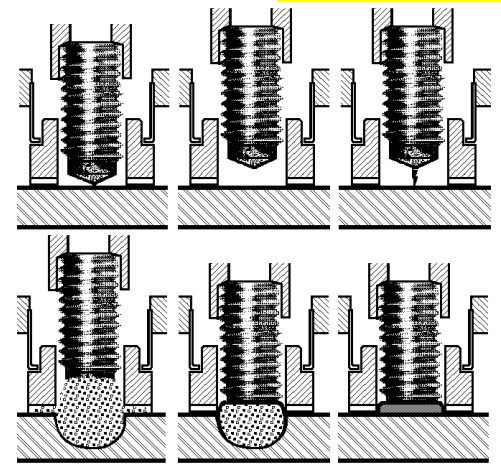
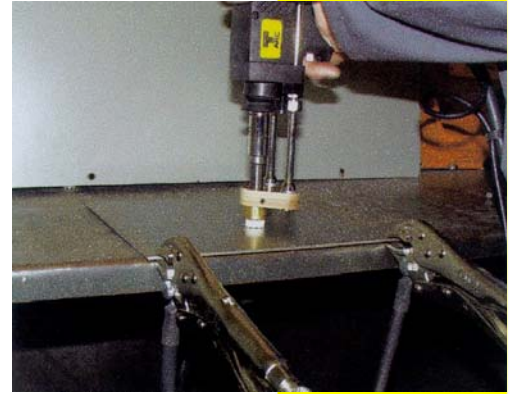
The welding process is as follows: -

1. Start.
2. Pistol lifts stud.
3. Pilot Arc strikes.
4. Main Arc strikes melting both stud and work piece.
5. Arc stops. Pistol plunges stud into molten pool.
6. Weld complete.

Having welded the stud, draw the pistol vertically off the stud. Failure to do this may cause the split tines of the chuck to splay out. This will result in the chuck and stud arcing together during subsequent welds.

Finally, remove the ferrule by lightly tapping until it shatters. Visually inspect the weld.

For a guide to the inspection of the welded stud see the section on Inspecting and Testing Welded Studs.



WELD SETTINGS

NOTES :-

This page is intended as a guide to setting your machine. The settings for, and quality of, all stud-welds are governed by many variable factors. These include, most obviously, the welding time, current and arc-gap (pistol lift), but can also include factors such as stud and work-piece material type and condition, ambient temperature, relative humidity, quality of supply etc. etc.

Below is a table of suggested settings. Please remember that these settings are given only as a guide and we insist that sample welds be carried out for every application as site conditions may vary from user to user and site to site.

STUD Ø	STUD TYPE	CURRENT SETTING (A)	TIME SETTING (ms)	PROTRUSION (mm)	LIFT (mm)
3	DA FB	300	100	5	1.5
M3	CD	325	125	5	1.5
M4	CD	325	150	4	1.5
M5	DA RB	350	150	3.5	1.5
M6	DA RB	375	175	3	1.5
6	DA FB	400	200	3	1.5
M8	DA RB	450	200	3	1.5
8	DA FB	500	250	3	1.5
M10	DA RB	600	250	4	1.5
10	DA FB	650	300	4	1.5
M12	DA RB	700	300	4.5	1.5
12	DA FB	800	350	4.5	1.5
M16	DA RB	1100	400	5	2
16	DA FB	1200	450	5	2

VISUAL WELD INSPECTION

The following pages will help you to recognise a poor weld when you see one and give some of the possible explanations as to how it may have occurred. Your test welds should look like the first example diagram in the series and when you transfer to the actual job, periodic checks should be made to ensure that your welding is consistently good.

POINTS TO LOOK FOR IRRESPECTIVE OF PROCESS USED.

1. L.A.W. (Length After Welding). This should be correct to within + 0 / - 1 mm.
2. The base fillet of the welded stud is complete.
3. The welded stud is perpendicular to the work piece.

1. WHEN USING A CERAMIC FERRULE.

This diagram is an example of a good normal weld, fulfilling the criteria above i.e. the L.A.W. is correct, the stud has a complete, well formed and even fillet and is also perpendicular to the work piece.

The following examples will help you to recognise the most common types of poor weld, explain the possible causes of these problems and how to remedy them.

EXAMPLE 1 :

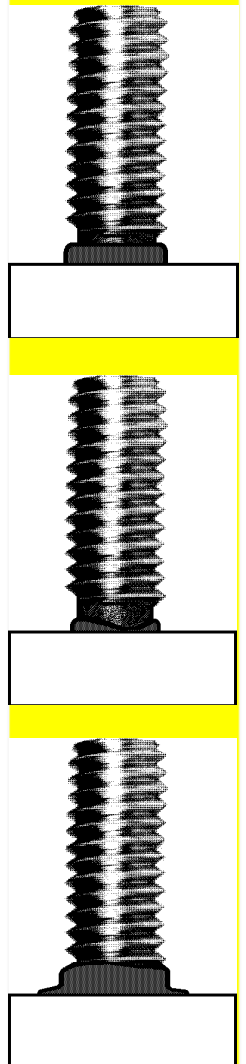
PROBLEM : Insufficient heat, causing the L.A.W. to be too long and the fillet to be underdeveloped and / or incomplete.

REMEDY : Increase the welding time (see page 14).

EXAMPLE 2 :

PROBLEM : Excessive heat, causing the L.A.W. to be too short and the fillet to be too large and messy, spreading out under the ferrule and / or splashing up the threads.

REMEDY : Reduce the welding time (see page 14).



VISUAL WELD INSPECTION

EXAMPLE 3 :

PROBLEM : The ferrule is not being held firmly against the work piece and / or the stud is binding against the ferrule.

REMEDY : Hold the pistol firmly down to the work piece (see page 15). and reset the alignment of the stud and ferrule (see page 13).

EXAMPLE 4 :

PROBLEM : Insufficient stud protrusion set on the pistol.

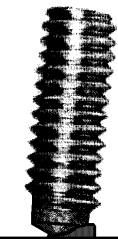
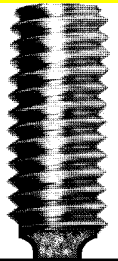
REMEDY : Adjust stud protrusion to correct setting (see page 13).

EXAMPLE 5 :

PROBLEM : Poor alignment i.e. stud is not perpendicular to the work piece.

REMEDY : Hold the pistol perpendicular to the work piece (see page 15).

NOTE : If the misalignment is only slight and in all other aspects the weld is good, then the weld may be salvaged by tapping straight with a soft mallet.



WELD TESTING

There are two factors which should receive special attention in establishing visually whether or not a stud weld is sound. These are :

1. The length after weld (L.A.W.) of the stud should be correct. That is to say that a stud which is intended to be 50 mm long after welding, should be correct within +0/-1 mm.

A word of explanation is perhaps needed on this point. All studs produced include a "weld allowance". This allowance is so arranged for the different diameters of stud, that it will be completely melted during the welding process, provided of course that the correct conditions have been established and the correct values of current and time are used.

2. The fillet of metal formed around the base of the stud should be well formed, reasonably evenly distributed, completely free from blow holes and of a silver blue colour.

These two factors combined form the basis of all visual stud weld examination. It should be the aim of every operator to produce these results.

Under normal conditions a stud welded to clean mild steel plate of adequate thickness having the correct L.A.W. and fillet formation. as described above, will be a satisfactory weld.

It should be remembered, however, that different applications or conditions will produce slightly different visual results, particularly in the appearance of the fillet, i.e.. Slightly rusty, dirty or oily plate will produce blow holes in the fillet, in proportion to the degree of plate contamination.

Welding close to some magnetic obstruction may produce uneven fillet distribution. Too much power will produce a fillet that flows too easily and is lost either up in the threads of the stud or out through the ferrule vents, while too little power may not melt sufficient material to form a complete fillet.

It is important, therefore, to judge the degree to which these possible variations will affect the weld strength, but in general, provided that the L.A.W. is correct and the fillet formation is not unsightly, a visual examination is all that is required.

WELD TESTING

Further testing may be carried out on a "percentage of production" basis, and the methods used fall into the classes outlined below.

1. DESTRUCTIVE TESTING.

Should only be used on studs welded to samples and test pieces.

a) Hammering a stud over may look spectacular, but it is not a satisfactory test, as the direction and force behind the blows is uncontrolled, as also is the point at which the impact takes place. The length, diameter and type of stud also have an effect on the results obtained.

b) Bending the stud over by using a tube of approximately the same bore as the stud diameter. This method is preferred to hammering, but again no conclusive evidence as to the strength of the weld is obtained.

c) Loading the stud by the use of washers / spacer and a nut until the stud breaks. This method is much more conclusive and should show that the weld is in fact stronger than the stud. Use of a suitably calibrated torque wrench for this test will give an indication of the U.T.S. developed by the stud material under test.

2. NON DESTRUCTIVE TESTING.

Generally the most practical way of testing threaded stud welds, without destroying the stud, is with the use of proof tests. Again a torque wrench is particularly useful for this purpose.

A table of torque settings is available on request from your equipment supplier.

STUDWELDING TECHNIQUES

The operating instructions given previously in this manual, apply to the majority of general applications, where it is possible to use the pistol in the down hand position and with standard cable lengths. For many applications these conditions do not apply and the following notes will give some guidance as to the methods used to obtain satisfactory results for a variety of applications.

1. WELDING TO A PLATE IN THE VERTICAL POSITION.

In this position there is a tendency for the weld metal to run to the underside of the stud during welding, due to the action of gravity, resulting in an uneven fillet. The effect is more noticeable as stud diameter increases and generally speaking it is not recommended that studs of 10 mm diameter and over be welded to vertical plates for this reason. The essential requirement to obtain satisfactory fillet formation is to use the shortest weld time possible. Welding to a vertical surface reduces the maximum size of the stud a given power source will weld.

It must be remembered, that greater care is required to ensure that the stud is perpendicular to the work piece. A special tripod foot attachment can be supplied if required. Take particular care to keep the ferrule grip, foot adapter and chuck clean.

2. WELDING TO A PLATE IN THE OVERHEAD POSITION.

IMPORTANT ! You must protect your face and shoulders with a helmet and cape before carrying out overhead welding operations. Weld spatter can do a lot of damage !

Firstly, obtain satisfactory weld settings in the down hand position before making attempts in the overhead position. Since the weld metal is transferred from stud to plate in small particles in the down hand position, it follows that, when welding overhead, the transfer takes place against gravity. As with vertical welding the best results will be achieved using the shortest possible weld time.

It is most important that the ferrule grip, foot adapter and chuck are kept clean to prevent shorts caused by weld spatter falling back onto them.

STUDWELDING TECHNIQUES

3. PISTOL ADJUSTMENTS WHEN WELDING IN THE VERTICAL OR OVERHEAD POSITIONS.

Problems may be encountered when welding in the vertical or overhead positions with a damped pistol.

To prevent problems occurring the damping effect should be removed. Undo the damper locknut and unscrew the damper (item 6, page 41) until the shaft movement is not slowed down by the damper.

(The damper thread should extend approximately 2 mm into the housing)
Re-tighten the damper locknut.

Welding can now continue as outlined in sections 1. and 2.

4. USING LONG CABLE LENGTHS.

Frequently the pistol must be used some distance from the nearest available mains supply, for instance on board ship, in power station and building construction, in workshops building large pre-fabricated structures etc. In these cases long lengths of welding cable are used and it must be realised at the outset that, the longer the cables the smaller the maximum diameter of stud which can be welded with a given power source.

To help get over this problem, if larger diameter studs are to be welded with long lengths of cable, either increase the welding cable conductor size or parallel cables together.

5. WELDING STUDS LESS THAN 25 mm LONG USING FERRULES.

As we have seen previously, the stud is held in a recess in the chuck and must be long enough to allow us to set the correct protrusion. A standard chuck has a recess 12 mm deep and ferrules vary in length up to 13.5 mm high. Thus if a stud is much less than 25 mm LAW we shall not be able to obtain the correct protrusion, i.e.. The chuck may hit the ferrule on the return stroke and prevent the stud returning to the plate correctly.

This problem may be overcome by using "shallow recess" chucks (the recess depth is only 6 mm) or if the studs are required to be very short, by using a special type of stud known as a "break-off" type. These studs have an overall LAW of 30 mm and are welded using a standard chuck and ferrule. The stud is "necked" at the required length from the welding end. After welding, the surplus portion of the stud is broken off with a pair of pliers. By these means, very short studs can easily be welded.

STUDWELDING TECHNIQUES

6. USING TEMPLATES TO ENSURE POSITIONAL ACCURACY.

When welding studs around the periphery of a flange, i.e. for cover plates, inspection doors etc., positioning of the studs in relation to each other becomes most important. A simple template made from 2 mm sheet, shaped to suit the component and provided with clamps is usually the answer to this problem. The position of the studs is accurately marked and holes drilled in these positions to accept either the ferrule of the stud to be welded or, if using short cycle, the pistol gas shroud. The size of the holes should be the outside diameter of the ferrule / shroud +0.4 mm. It is also advisable to provide 2 mm thick pads underneath the template so that there is a space between the component and template, this space will allow the gases developed during welding to vent properly from the ferrule / shroud. For any further advice or help in the design of jiggling or templates contact your local field sales engineer.

7. MINIMUM PLATE THICKNESSES WHEN STUD WELDING.

When using standard Drawn Arc with ceramic ferrules, the minimum ratio of stud diameter to plate thickness is 4 : 1 for plate thickness greater than 3 mm and 3 : 1 for plate thickness between 1.5 mm and 3 mm. When using the short cycle system with or without gas purging it is possible to weld equivalent size studs onto slightly thinner sections, due to the short weld duration. These ratios ensure that the strength of the plate is sufficient to support a stud of a given size when it is loaded, without there being a tendency for the plate to distort.

Occasionally, however, it may be necessary to weld a stud outside of these ratios. This can sometimes be accomplished without distortion by "heat sinking" the component, by using a flat copper or water cooled backing piece behind the weld area, to support the plate and assist in dissipating heat quickly

8. WELDING STAINLESS STEEL.

Austenitic stainless steel studs of the 18/8 g/N : weld decay proof type can be supplied for welding to similar parent or mild steel. The technique does not differ from that used for mild steel stud welding. There is a tendency with larger diameters of stainless steel studs for metal transfer across the arc to take the form of large particles. If short circuits occur then the arc can be heard to splutter.

STUDWELDING TECHNIQUES

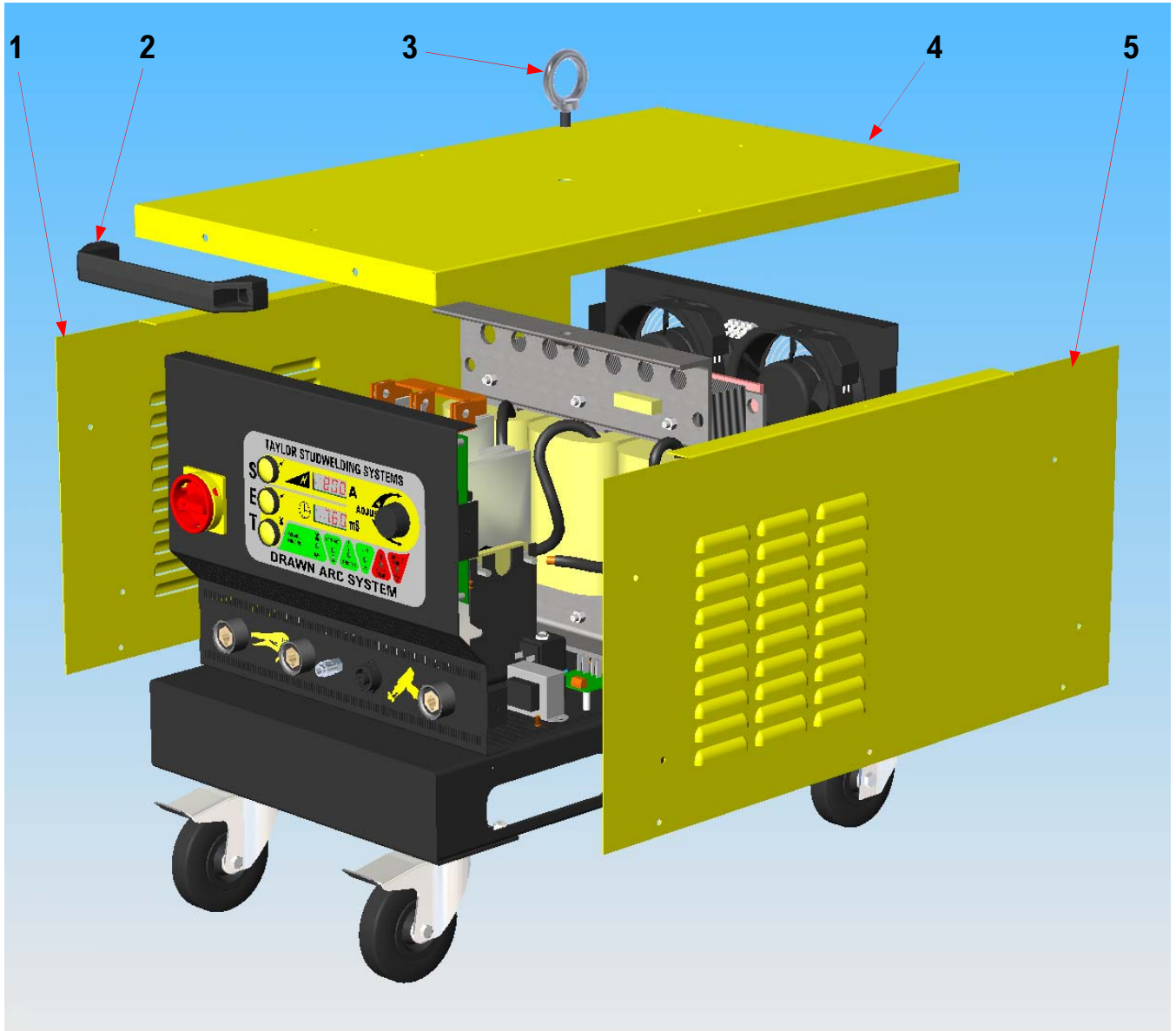
This may occur with any diameter of stainless steel stud if the lift of the hand tool is not correct. Due to this tendency to transfer in large particles time settings should be kept as low as possible.

9. WELDING CLOSE TO CORNERS, FLANGES AND OTHER OBSTACLES.

When welding close to the edge of a plate, in / on a corner, on long strips of narrow plate etc., an effect known as "arc-blow" occasionally will produce an uneven fillet, in such a fillet, most of the material is blown to one side of the stud. "Arc-blow" is caused by the magnetic forces surrounding the arc being intensified in one direction, due to the presence of an air gap or the proximity of a large mass of magnetic material. It is dependant on a number of factors, size of stud, shape of component, position of earth connection, current density etc., and no hard and fast rules can be applied to correct it. The following methods are generally helpful, but if satisfactory results cannot be obtained, our field staff will be pleased to advise you. Check that no other fault is present by welding a few studs on to a test piece and inspecting the fillet formation, before deciding that "arc-blow" is causing the uneven fillet.

"Arc-blow" can sometimes be corrected by placing a block of steel near the position of the weld area, on the opposite side to that at which the fillet has blown. When welding near the edge of a plate, the fillet will be blown towards the general mass of material, i.e.. away from the edge. The block in this case should therefore be placed at the edge the plate, touching it, thus providing a more evenly distributed magnetic field. The earth connection can be located immediately below the position of the stud weld, this latter is not always practicable, since it requires the earth connections to be moved frequently. The use of two earth connections, spaced evenly across the welding area, is also advisable.

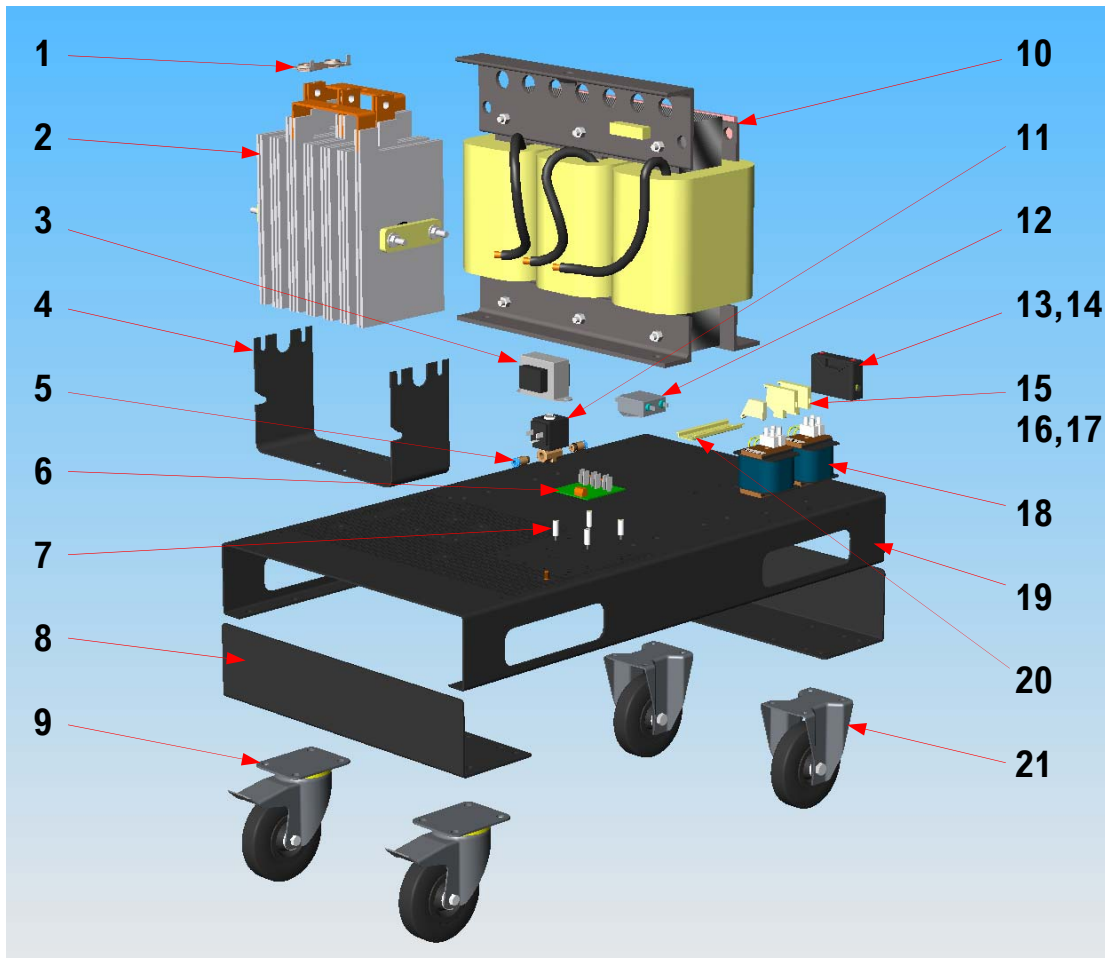
CONTROLLER EXPLOSION



ITEM	No. OFF	PART No.	DESCRIPTION
1	1	81-106-186	SIDE PANEL
2	1	81-112-011	HANDLE - ! NOT FOR LIFTING !
3	1	81-106-192	EYEBOLT
4	1	81-106-179	COVER
5	1	81-106-185	SIDE PANEL



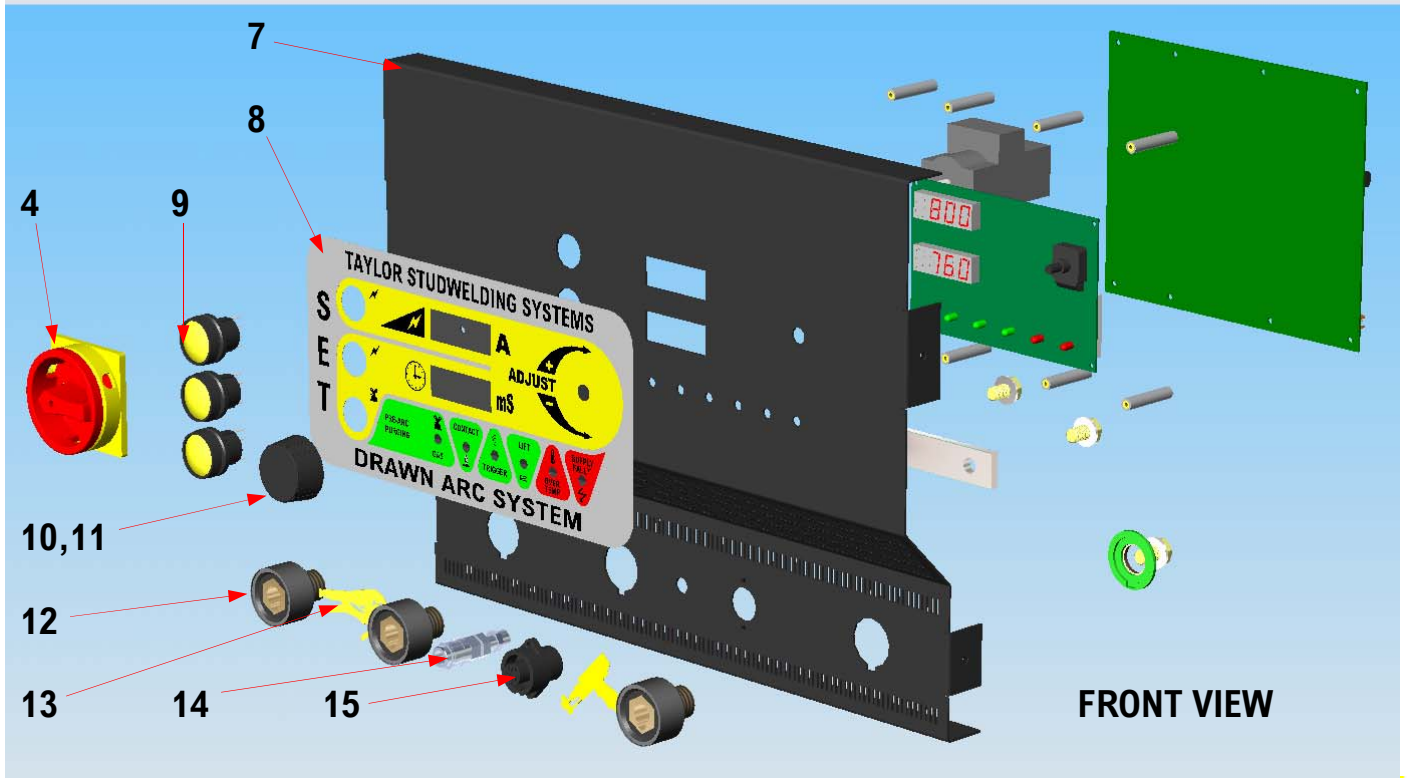
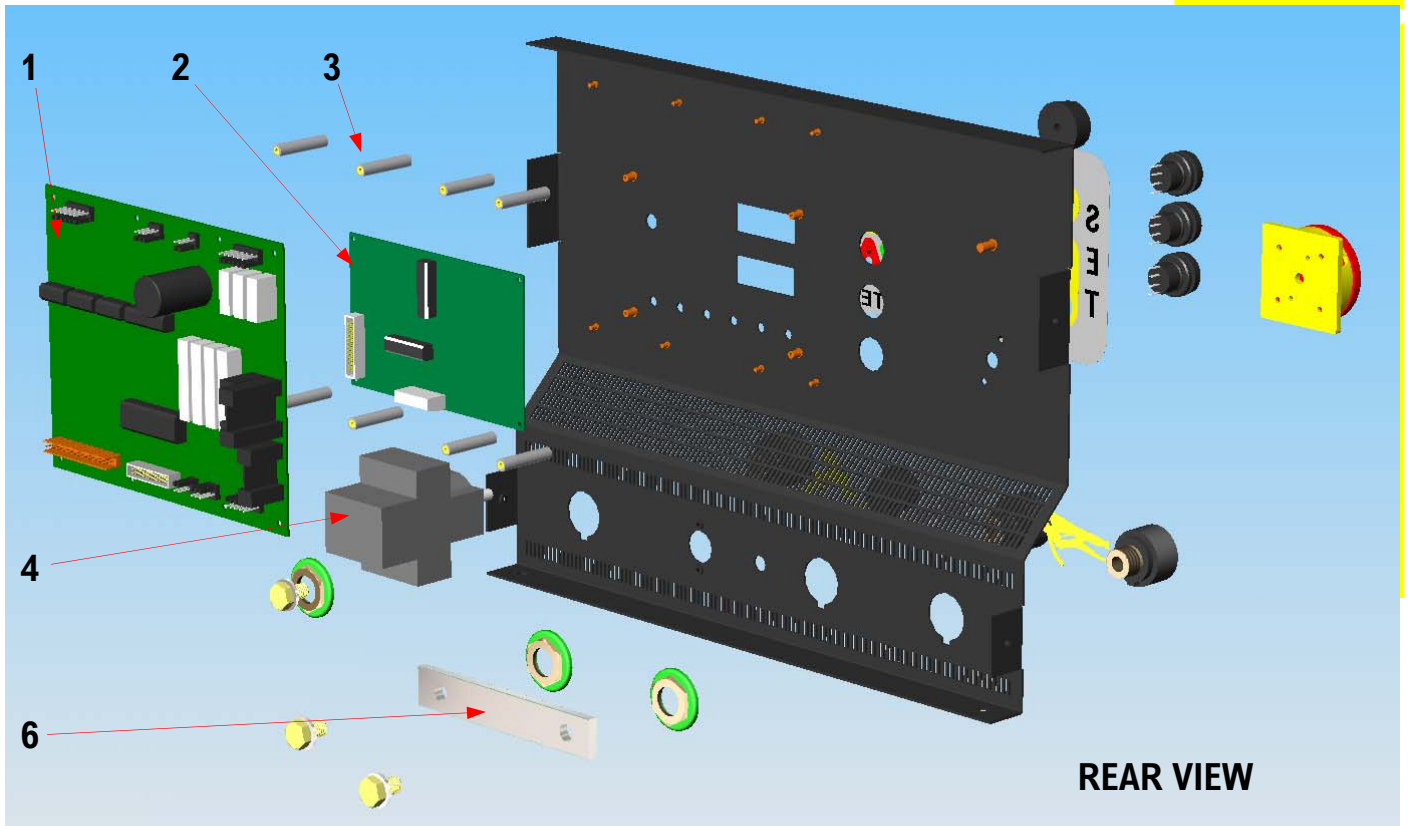
CONTROLLER EXPLOSION



ITEM	No. OFF	PART No.	DESCRIPTION
1	1	81-106-195	SHUNT
2	1	81-120-056	RECTIFIER
3	1	81-120-055	AUXILIARY TRANSFORMER
4	1	81-120-039	RECTIFIER BRACKET
5	2	71-200-065	GAS FITTING
6	1	81-200-006	PILOT ARC PCB
7	4	81-104-083	MOUNTING PILLAR
8	2	81-106-178	CASTOR PLATE
9	2	81-106-009	CASTOR - SWIVEL & BRAKE
10	1	81-106-200	MAIN TRANSFORMER
11	1	81-108-071	GAS VALVE
12	1	81-106-197	MAIN FILTER
13	1	81-106-040	FUSEHOLDER
14	1	81-106-033	FUSE (NOT SHOWN)
15	2	81-106-041	FUSEHOLDER (RAIL MOUNTING)
16	1	70-102-017	10A FUSE (NOT SHOWN)
17	1	81-106-036	2A FUSE (NOT SHOWN)
18	2	81-106-059	PILOT ARC CHOKE
19	1	81-106-176	BASEPLATE
20	2	81-106-011	CASTOR - FIXED



CONTROLLER EXPLOSION



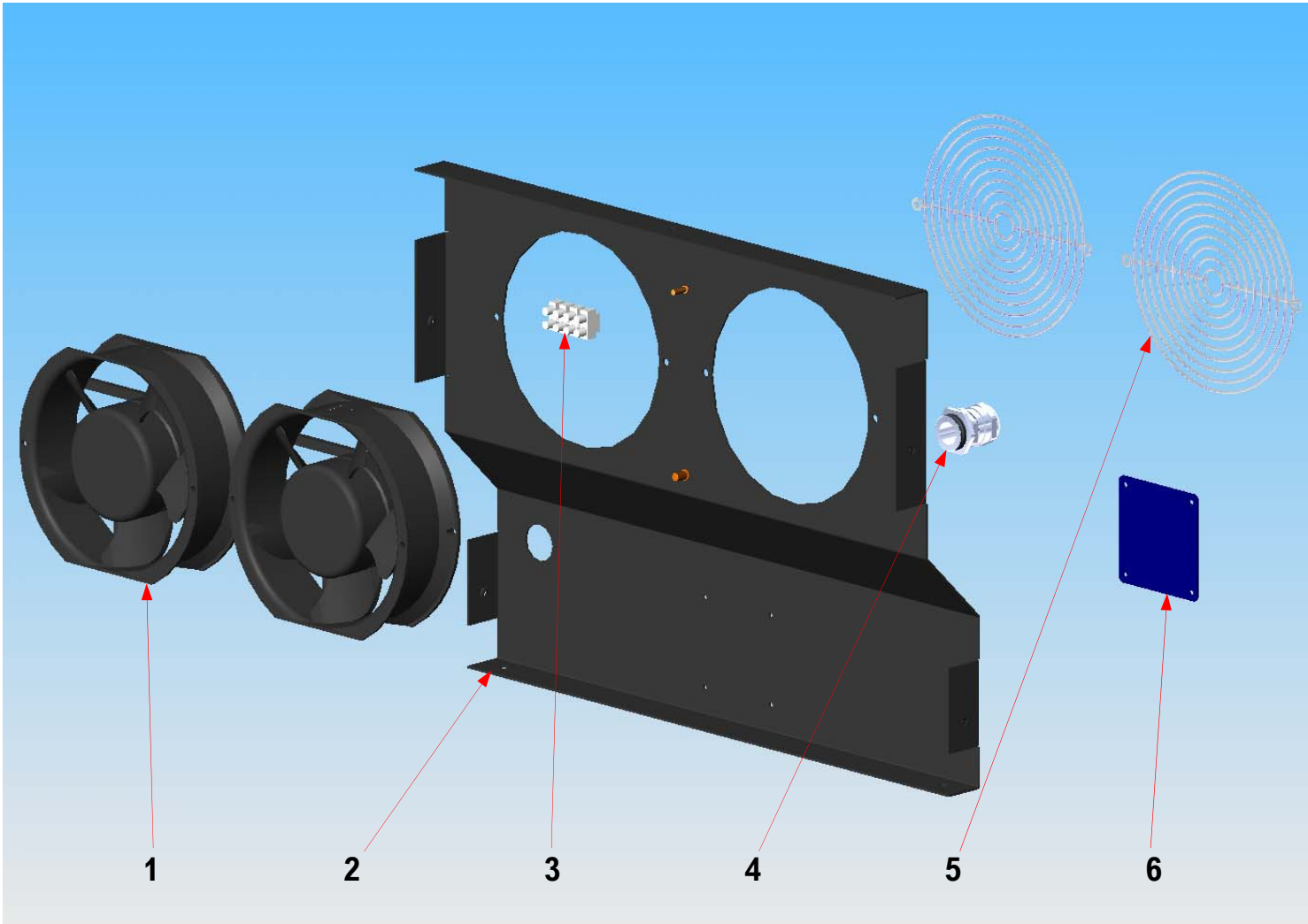
SEE NEXT PAGE FOR PARTS LISTING.

CONTROLLER EXPLOSION

ITEM	No. OFF	PART No.	DESCRIPTION
1	1	81-200-003	MAIN CONTROL PCB
2	1	81-200-001	DISPLAY PCB
3	8		MOUNTING PILLAR
4	1	81-104-066	MAINS ON/OFF SWITCH
6	1	81-106-189	EARTH BUSBAR
7	1	81-106-193	FRONT PANEL
8	1	81-200-003	CONTROL OVERLAY
9	3	81-120-060	PUSHBUTTON
10	1	81-104-030	KNOB
11	1	81-104-032	CAP
12	3	81-106-031	WELDING SOCKET
13	1	81-106-182	SOCKET DECAL SET
14	1	81-108-072	GAS SOCKET
15	1	70-102-025	4 PIN PANEL SOCKET
16	1	81-106-201	WIRING HARNESS (NOT SHOWN)



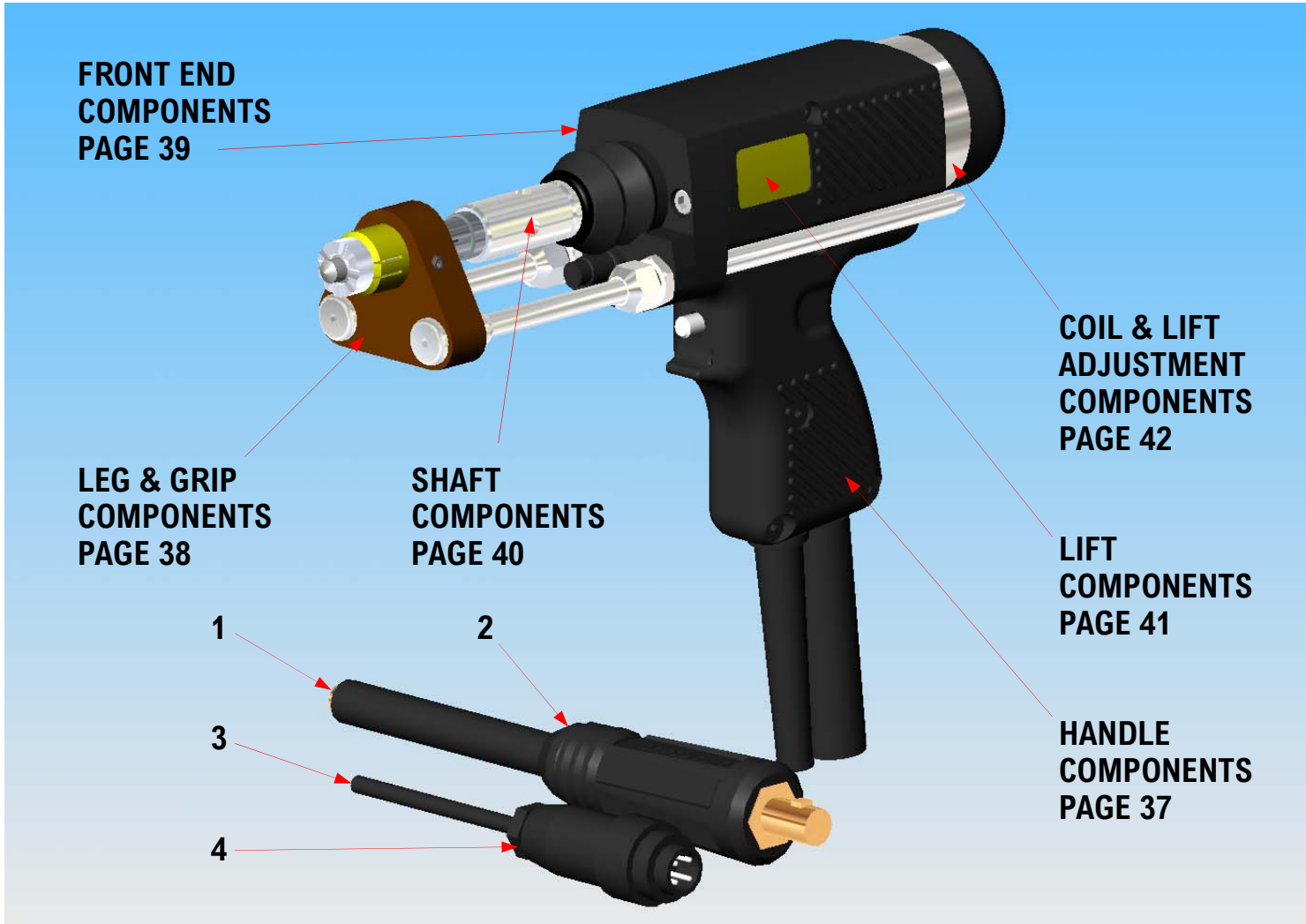
CONTROLLER EXPLOSION



ITEM	No. OFF	PART No.	DESCRIPTION
1	2	81-106-081	FAN
2	1	81-106-175	BACK PANEL
3	1	81-108-030	TERMINAL BLOCK
4	1	81-108-019	CABLE GLAND
5	2	81-104-220	FINGER GUARD
6	1	81-106-174	SERIAL/DATA LABEL
7	3	71-300-008	4 CORE FLEXIBLE MAINS CABLE - NOT SHOWN
8	1	81-108-073	400V, 32A, 5 PIN MAINS PLUG - NOT SHOWN



DA2 EXPLOSION

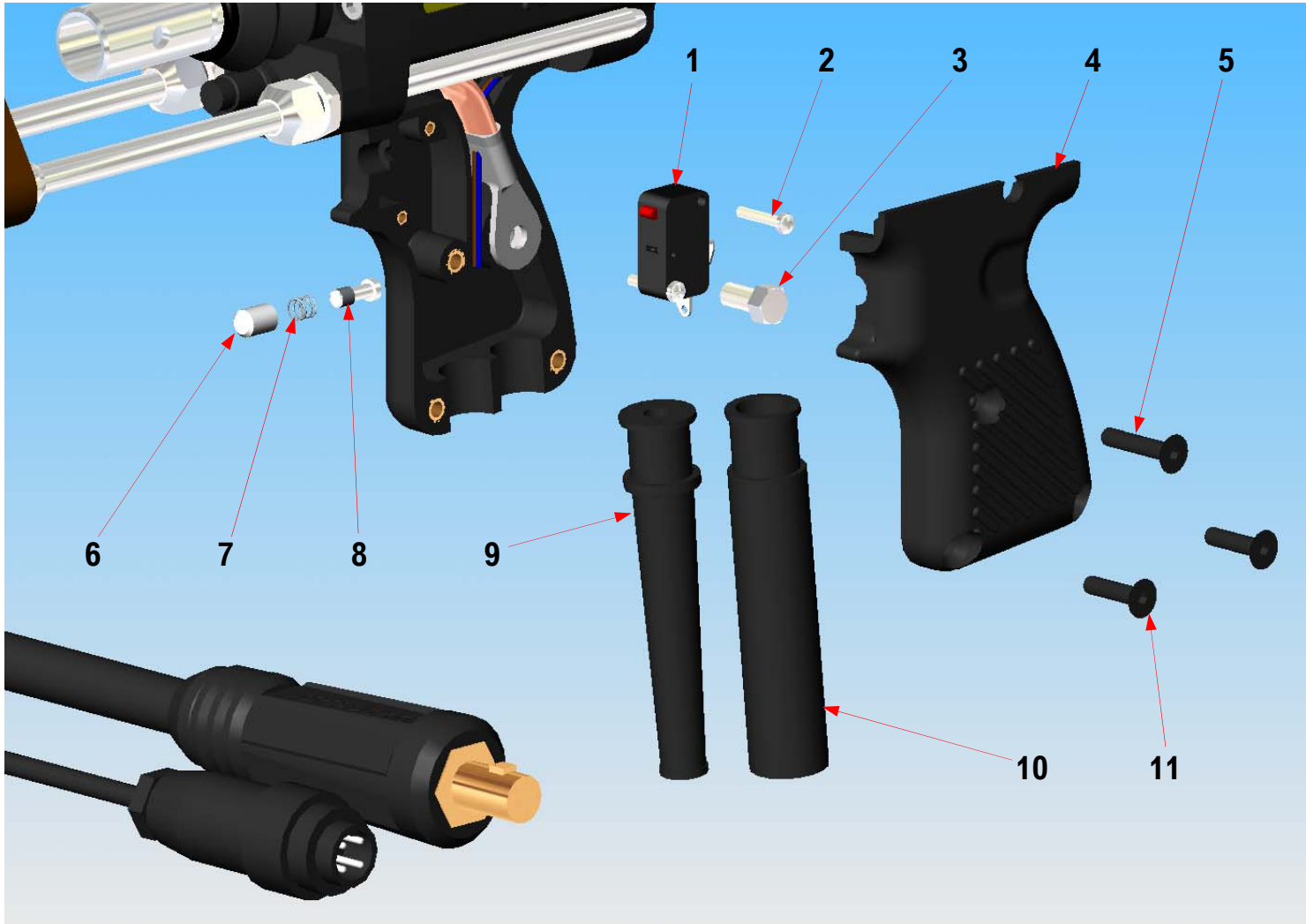


SEE THE PAGES LISTED ABOVE FOR COMPONENT EXPLOSIONS AND PARTS LISTS FOR THE PISTOLS.

ITEM	No. OFF	PART No.	DESCRIPTION
1	5	71-300-004	50 mm ² WELDING CABLE (m)
2	1	81-101-051	WELDING PLUG
3	5½	71-300-009	4 CORE CONTROL CABLE (m)
4	1	71-101-030	4 PIN CONTROL PLUG
5	11	71-101-032	CABLE CLIP (NOT SHOWN)



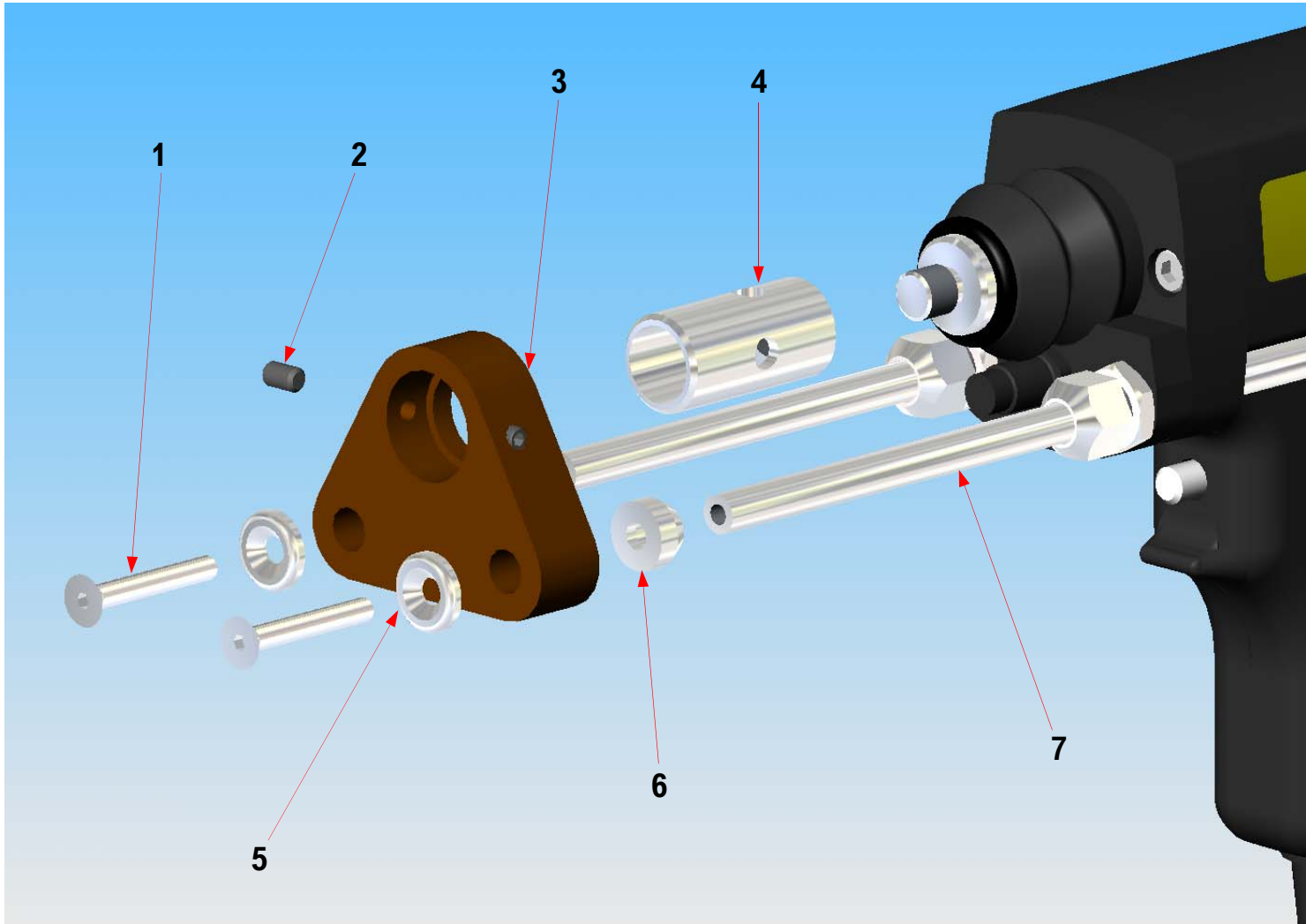
DA2 EXPLOSION



ITEM	No. OFF	PART No.	DESCRIPTION
1	1	81-101-031	SWITCH
2	2	Z200-03-016	SCREW
3	1	Z305-14-012	SCREW
4	1	81-101-045	HANDLE COVER
5	1	Z120-05-025	SCREW
6	1	81-101-125	PUSHBUTTON
7	1	81-101-030	SPRING
8	1	81-101-089	SWITCH ACTUATOR
9	1	81-101-054	CABLE SLEEVE (CONTROL)
10	1	81-101-044	CABLE SLEEVE (WELD)
11	2	Z120-05-020	SCREW



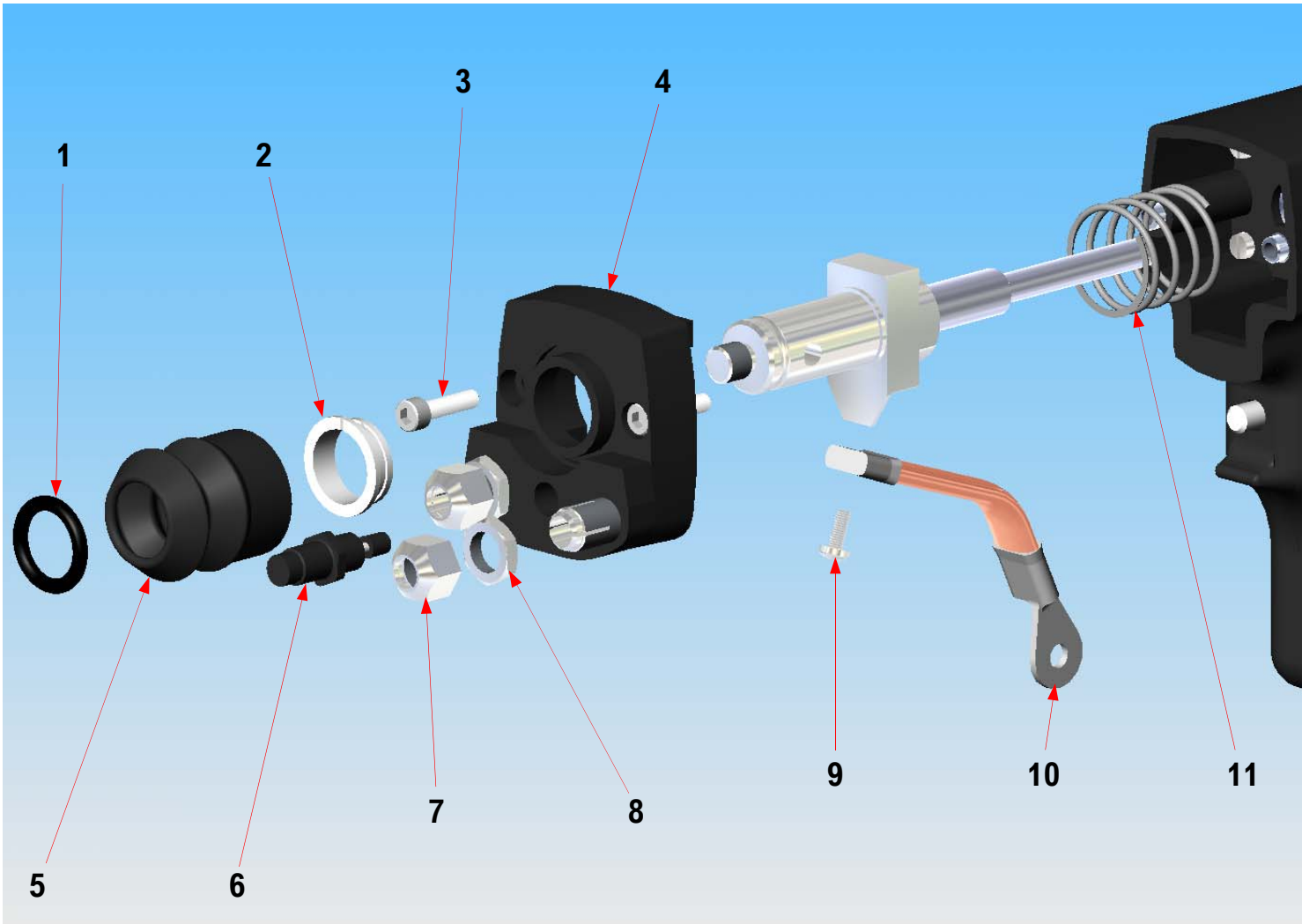
DA2 EXPLOSION



ITEM	No. OFF	PART No.	DESCRIPTION
1	2	Z125-05-035	SCREW
2	2	Z400-05-008	GRUB SCREW
3	1	81-101-002	FOOT ADAPTOR (M3 - M12)
or	1	81-101-063	FOOT ADAPTOR (M12 - M20)
4	1	81-101-005	CHUCK ADAPTOR
5	2	81-101-003	FOOT WASHER
6	2	81-101-001	FOOT WASHER
7	2	81-101-004	LEG



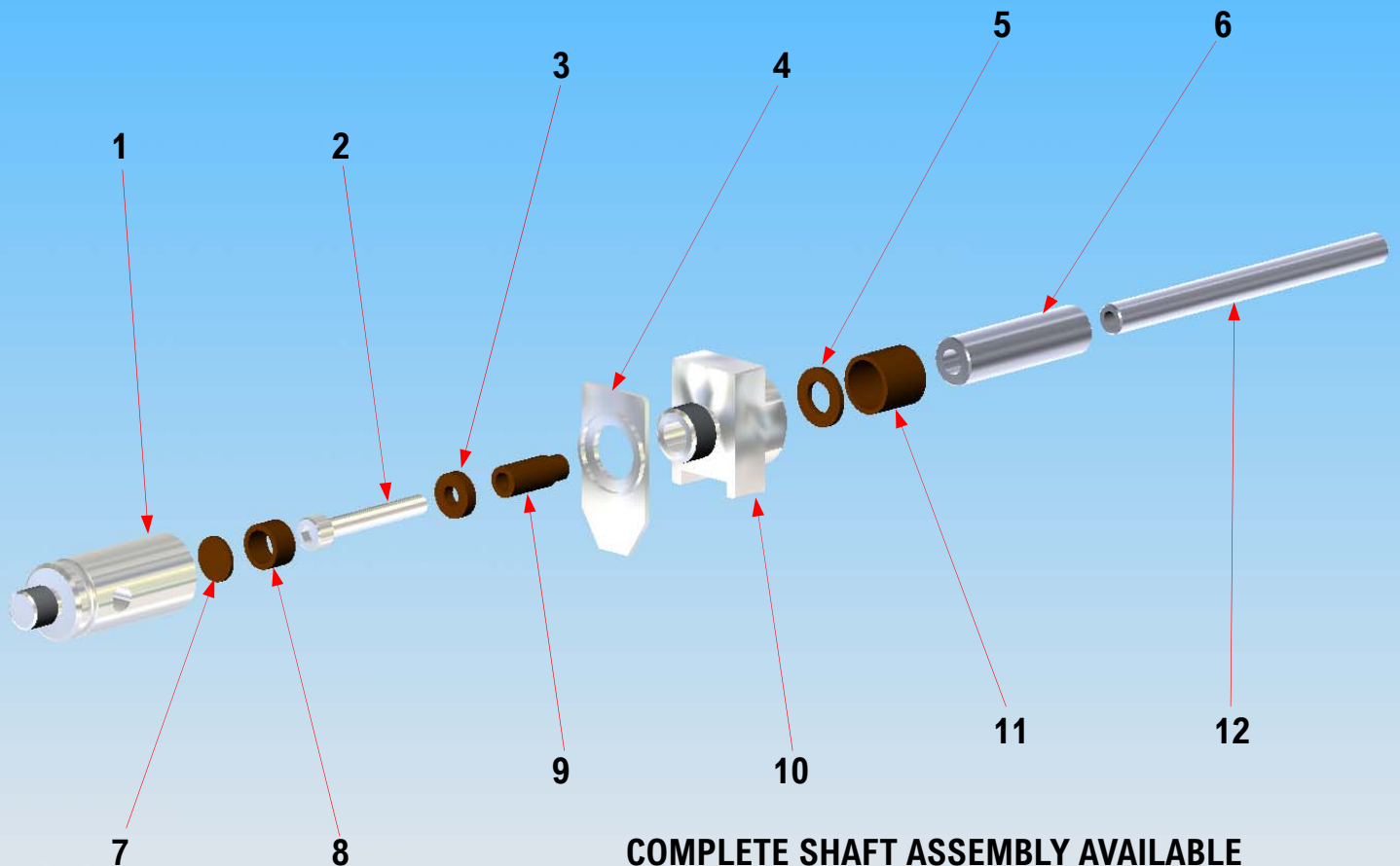
DA2 EXPLOSION



ITEM	No. OFF	PART No.	DESCRIPTION
1	1	81-101-168	O RING
2	1	81-101-007	BEARING
3	2	Z105-05-020	SCREW
4	1	81-101-010	FRONT END CAP
5	1	81-101-006	BELLOWS
6	1	81-101-107	DAMPER
7	2	81-101-077	GRIP NUT
8	2	81-101-157	LOCKNUT
9	1	Z200-04-010	SCREW
10	1	81-101-061	FLEXIBLE BRAID
11	1	81-101-012	SPRING



DA2 EXPLOSION

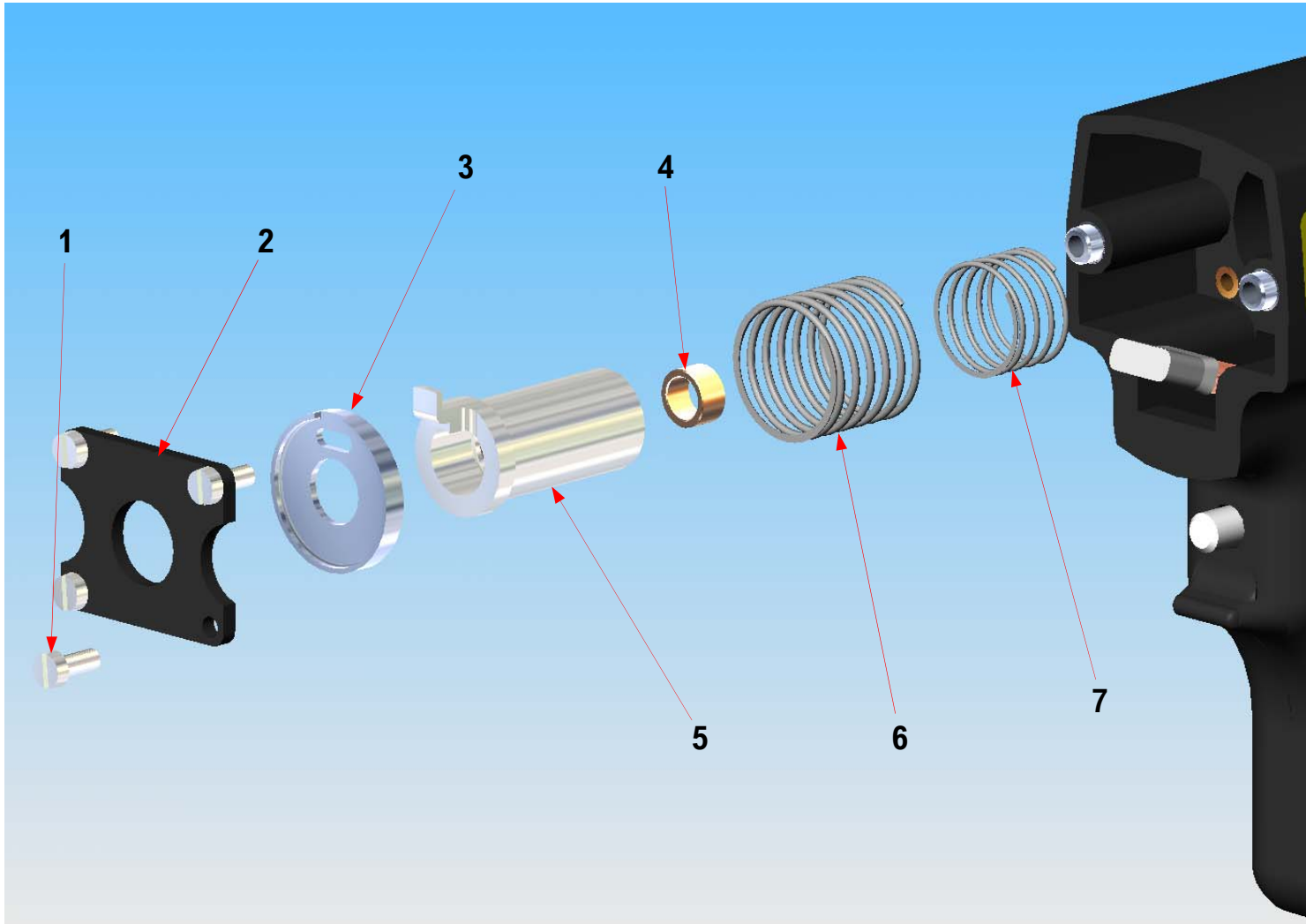


**COMPLETE SHAFT ASSEMBLY AVAILABLE
UNDER PART No. 81-101-080**

ITEM	No. OFF	PART No.	DESCRIPTION
1	1	81-101-064	SHAFT ADAPTOR
2	1	Z105-05-035	SCREW
3	1	81-101-068	INSULATOR
4	1	81-101-109	ACTUATOR PLATE
5	1	81-101-071	INSULATOR
6	1	81-101-073	LIFTING SLEEVE
7	1	81-101-065	INSULATOR
8	1	81-101-066	INSULATOR
9	1	81-101-069	INSULATOR
10	1	81-101-070	SHAFT BLOCK
11	1	81-101-072	INSULATOR
12	1	81-101-106	GUIDE SHAFT



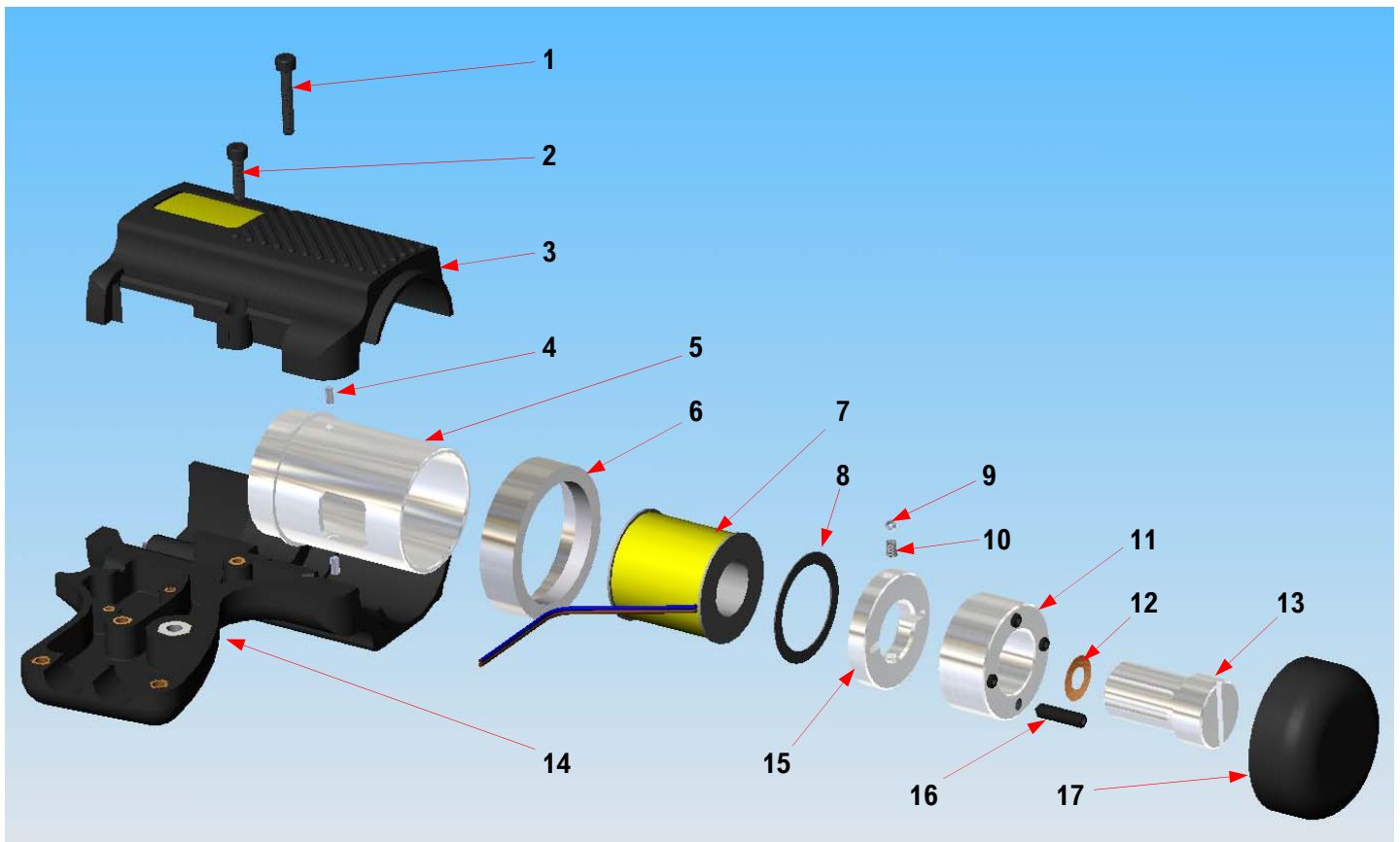
DA2 EXPLOSION



ITEM	No. OFF	PART No.	DESCRIPTION
1	4	Z220-04-010	SCREW
2	1	81-101-014	RETAINING PLATE
3	1	81-101-015	LIFTING RING
4	2	81-101-250	BEARING BUSH
5	1	81-101-016	LIFTING HOOK
6	1	81-101-018	SPRING
7	1	81-101-017	SPRING



DA2 EXPLOSION

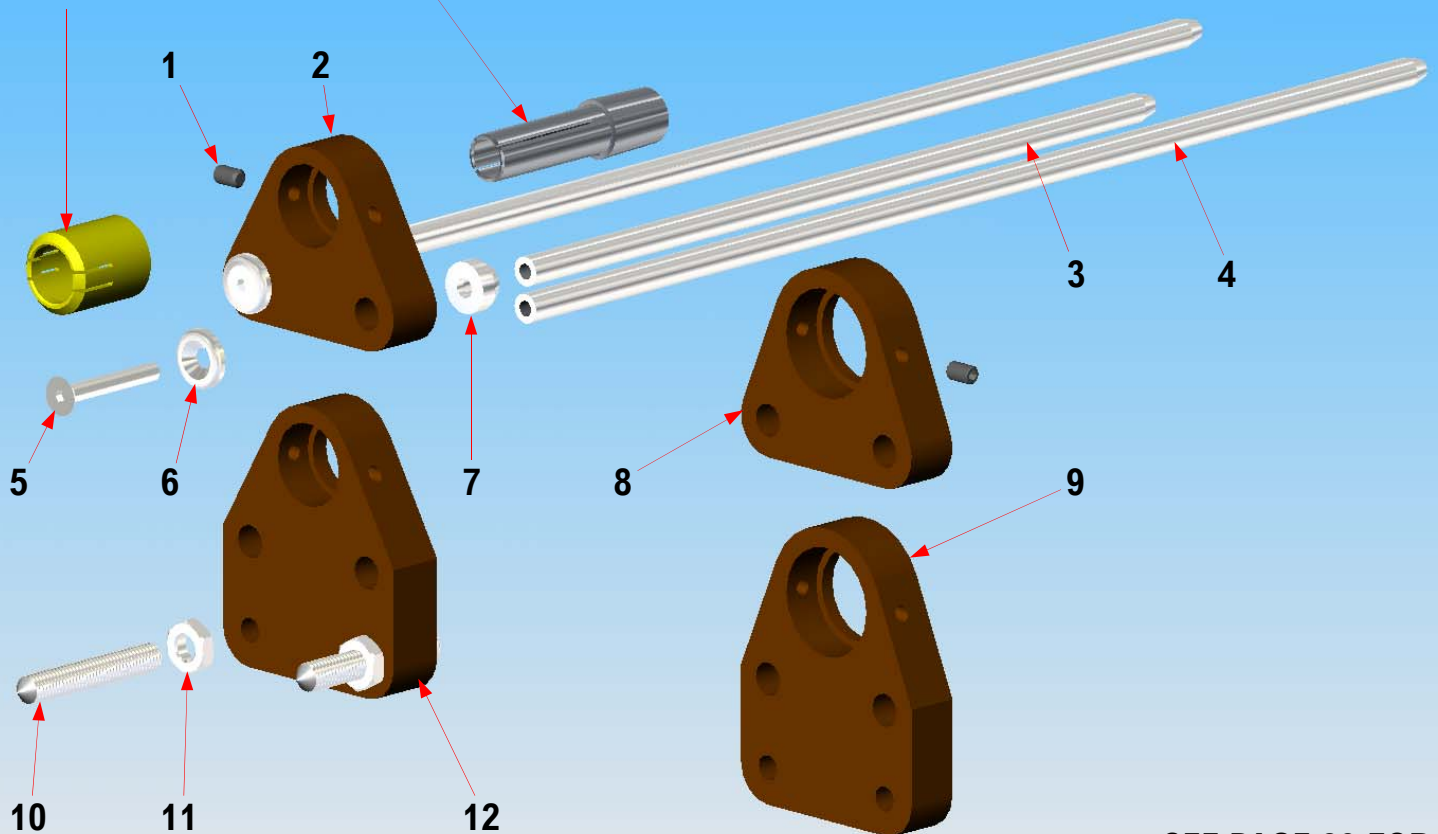


ITEM	No. OFF	PART No.	DESCRIPTION
1	1	Z100-04-025	SCREW
2	1	Z100-04-016	SCREW
3	1	81-101-024	PISTOL HALF MOULDING
4	2	81-101-255	PIN
5	1	81-101-103	COIL HOUSING
6	1	81-101-102	BODY LOCKING RING
7	1	81-101-038	COIL
8	1	81-101-039	SPRING WASHER
9	1	81-101-082	DETENT BALL
10	1	81-101-083	SPRING
11	1	81-101-104	COIL LOCKING RING
12	1	81-101-161	MAGNETIC RELEASE WASHER
13	1	81-101-105	BACKSTOP
14	1	81-101-023	PISTOL HALF MOULDING
15	1	81-101-043	DETENT HOUSING
16	4	Z410-05-020	SCREW
17	1	81-101-101	REAR END CAP



ACCESSORIES

SEE PAGE 39 FOR STANDARD CHUCK
AND FERRULE GRIP RANGE



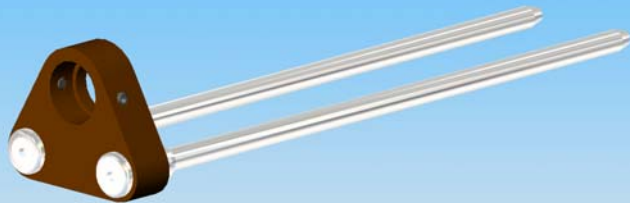
SEE PAGE 39 FOR
COMPLETE ASSMBLIES

ITEM	QTY.	PART No.	DESCRIPTION
1	2	Z400-05-008	GRUB SCREW
2	1	81-101-002	STANDARD FOOT ADAPTOR (M3 - M12)
3	2	81-101-004	STANDARD LEG (230mm)
4	2	81-101-081	EXTENDED LEG (330mm)
5	2	Z125-05-035	SCREW
6	2	81-101-003	FOOT WASHER
7	2	81-101-001	FOOT WASHER
8	1	81-101-063	STANDARD FOOT ADAPTOR (M16 - M20)
9	1	81-101-131	TRIPOD FOOT ADAPTOR (M16 - M20)
10	2	Z415-08-050	GRUB SCREW
11	2	Z510-08-000	LOCKNUT
12	1	81-101-126	TRIPOD FOOT ADAPTOR (M3 - M12)



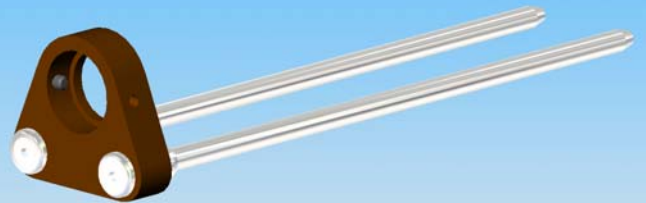
ACCESSORIES

**STANDARD FOOT ADAPTOR (M3 - M12)
STANDARD LEGS**



**COMPLETE ASSEMBLY
81-101-158**

**STANDARD FOOT ADAPTOR (M16 - M20)
STANDARD LEGS**



**COMPLETE ASSEMBLY
81-101-159**

**TRIPOD FOOT ADAPTOR (M3 - M12)
STANDARD LEGS**



**COMPLETE ASSEMBLY
81-101-140**

**TRIPOD FOOT ADAPTOR (M16 - M20)
STANDARD LEGS**



**COMPLETE ASSEMBLY
81-101-141**



STUD DIAMETER	CHUCK PART No.	FERRULE GRIP PART No.
M3	89-101-203	89-101-051
M4	89-101-204	89-101-051
M5	89-101-205	89-101-052
M6	89-101-206	89-101-052
M8	89-101-208	89-101-053
M10	89-101-210	89-101-054
M12	89-101-212	89-101-055
M16	89-101-216	89-101-056
M20	89-101-220	89-101-057



DA8 EXPLOSION

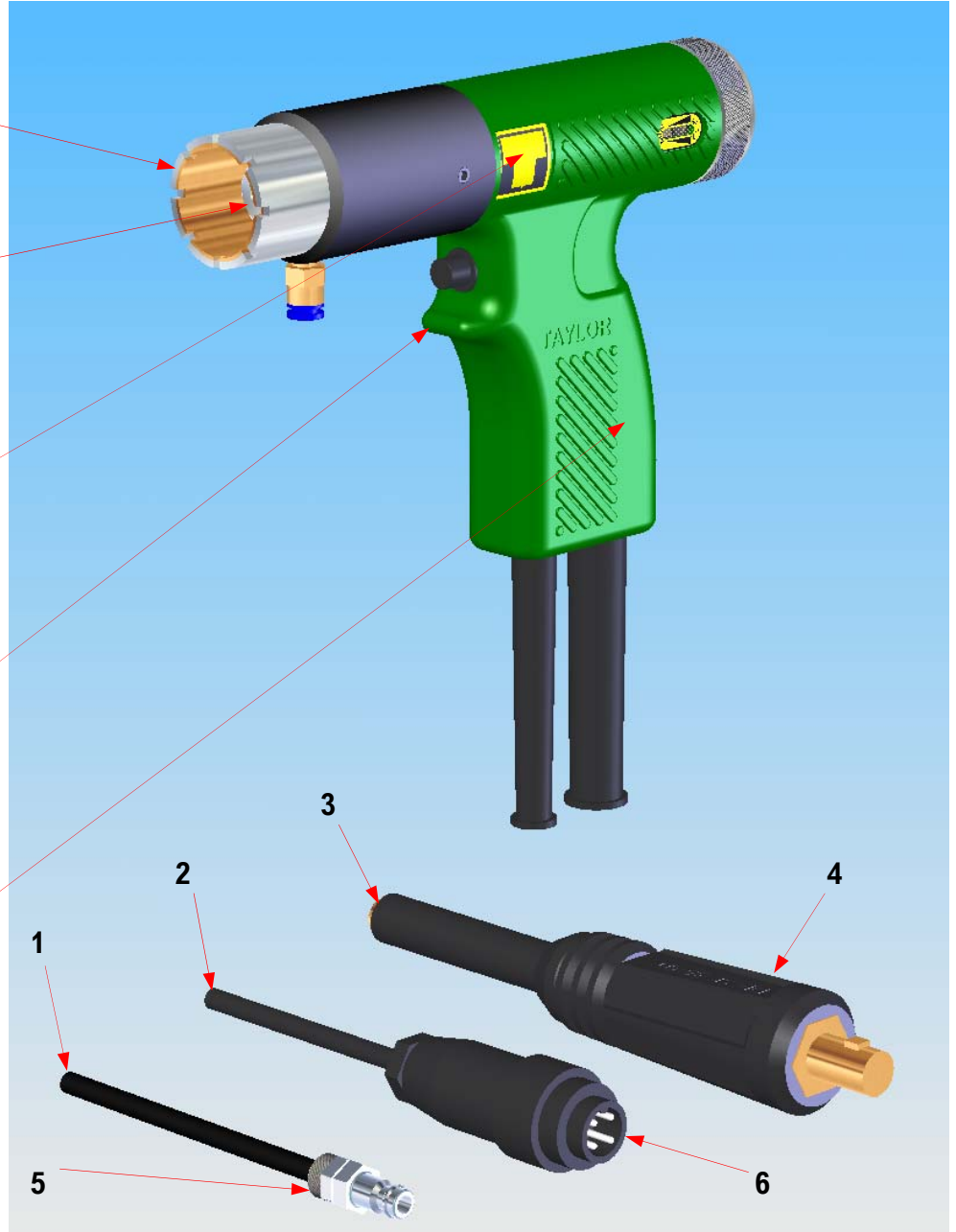
SEE PAGE 42 FOR
FRONT AND REAR
END PARTS

SEE PAGE 46 FOR
SHAFT ASSEMBLY
PARTS

SEE PAGE 45 FOR
BARREL ASSEMBLY
PARTS

SEE PAGE 43 FOR
SPLIT BODY
PARTS

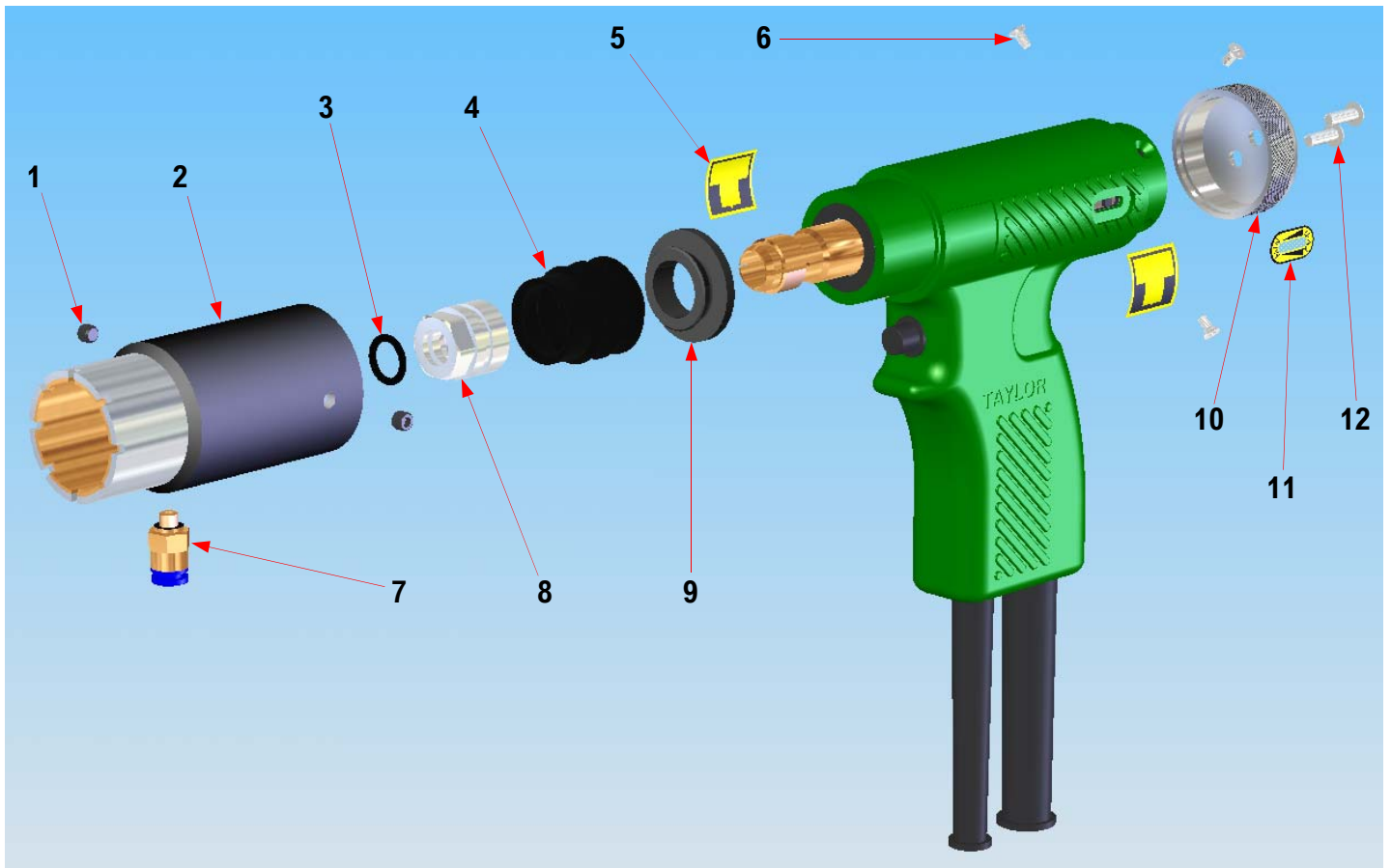
SEE PAGE 44 FOR
PISTOL GRIP
PARTS



ITEM	No. OFF	PART No.	DESCRIPTION
1	4½	71-200-044	GAS PIPE
2	4½	71-300-009	CONTROL CABLE
3	4	71-300-002	WELDING CABLE
4	1	81-101-051	WELDING PLUG
5	1	71-200-069	GAS PLUG
6	1	71-101-030	CONTROL PLUG
7	9	71-101-032	CABLE TIE (NOT SHOWN)



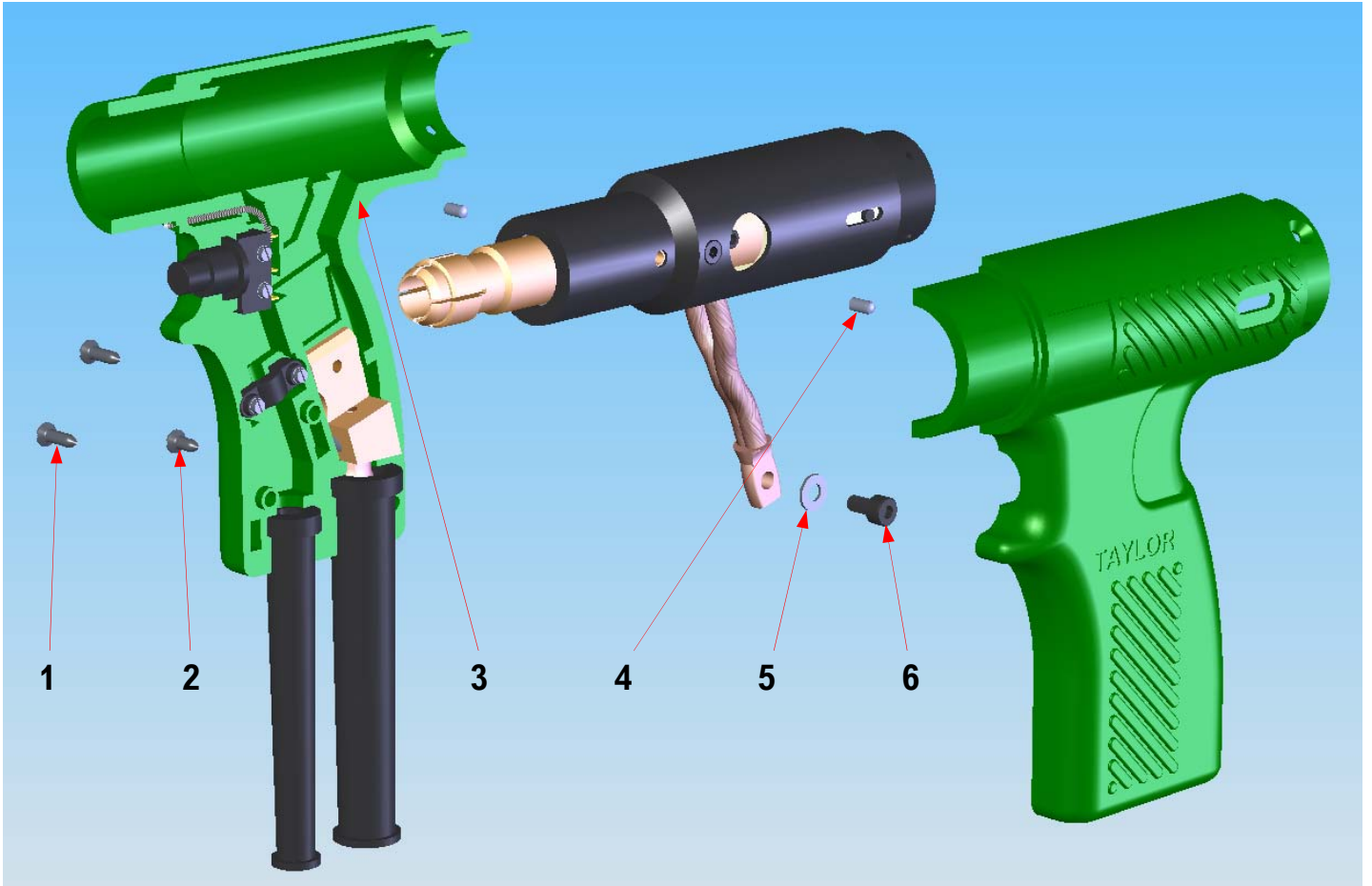
DA8 EXPLOSION



ITEM	No. OFF	PART No.	DESCRIPTION
1	2	Z400-05-005	GRUB SCREW
2	1	89-101-535	30 mm GAS NOSE CONE
3	1	71-101-001	"O" RING
4	1	71-101-003	RUBBER BELLOWS
5	2	71-101-050	DECAL STICKER
6	4	Z205-03-006	SCREW
7	1	KQH06-M5	GAS FITTING
8	1	71-101-002	CHUCK NUT
9	1	71-101-004	BELLOWS RETAINER
10	1	71-102-067	REAR END CAP
11	1	71-102-070	LIFT INDICATION DECAL
12	2	Z110-04-012	SCREW



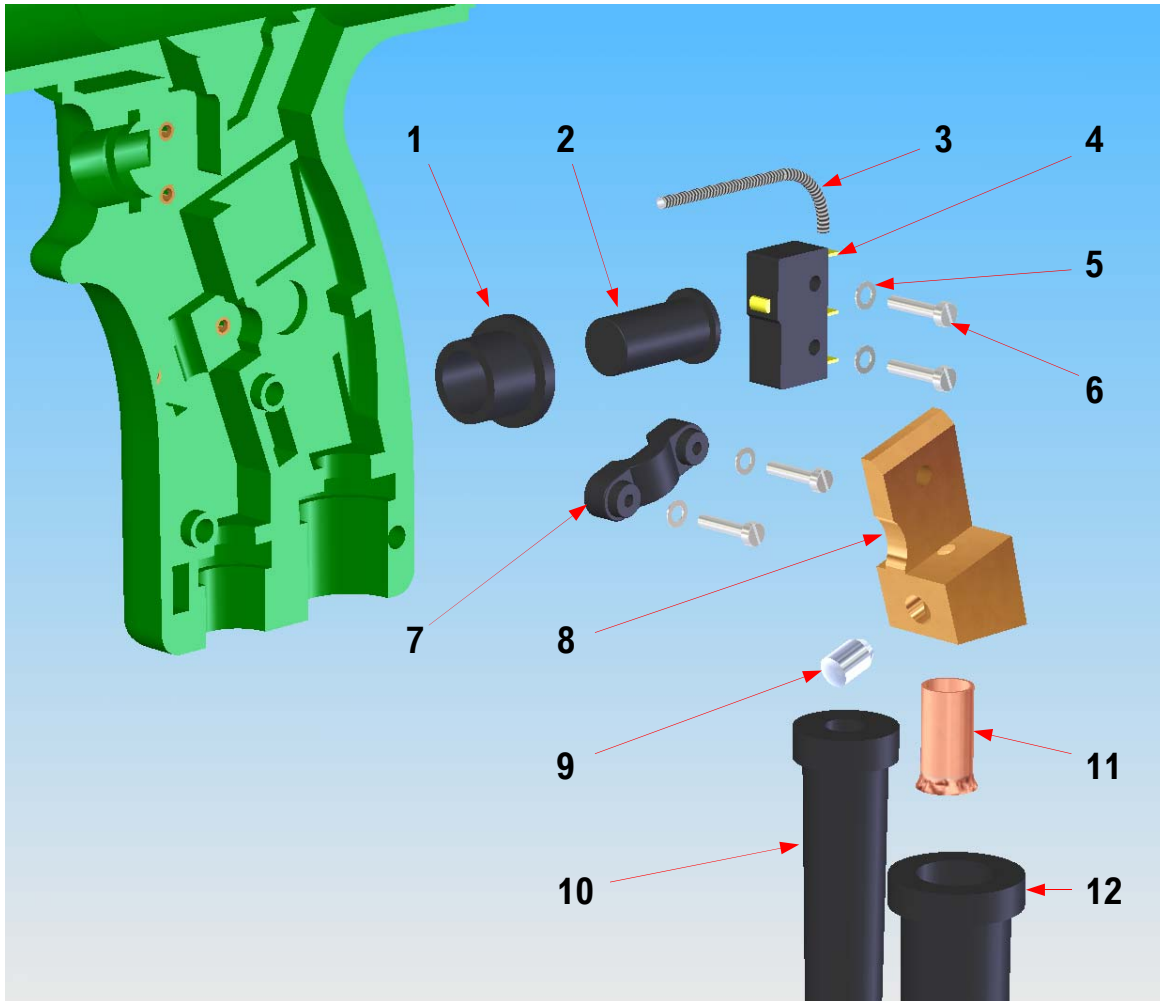
DA8 EXPLOSION



ITEM	No. OFF	PART No.	DESCRIPTION
1	2	Z245-06-016	SCREW
2	1	Z245-06-012	SCREW
3	1	71-102-069	PISTOL BODY (PAIR - GREEN)
4	2	Ø3 x 5	PIN
5	1	Z600-04-000	WASHER
12	1	Z100-04-010	SCREW



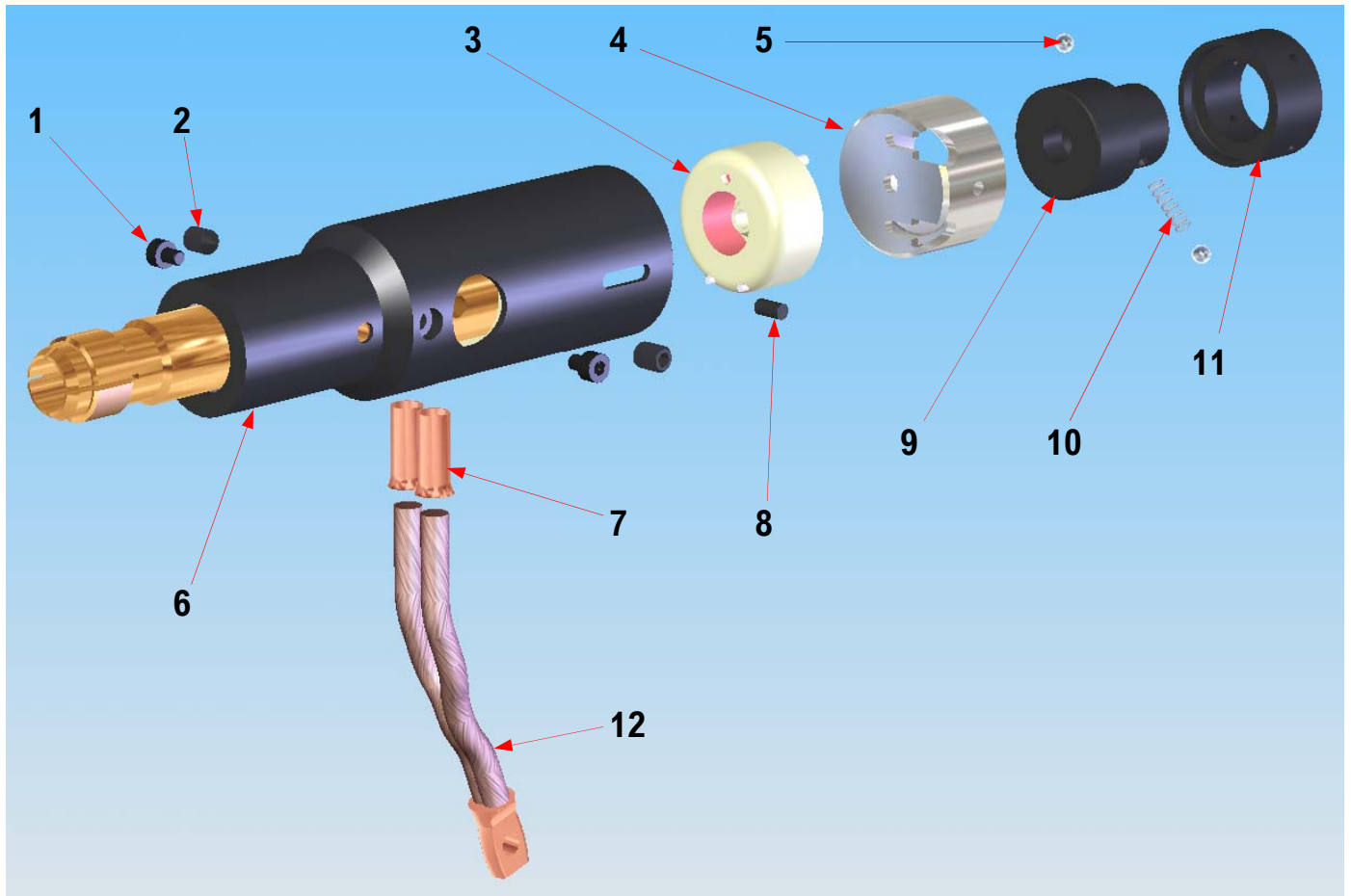
DA8 EXPLOSION



ITEM	No. OFF	PART No.	DESCRIPTION
1	1	71-101-036	PUSH-BUTTON BUSH
2	1	71-101-035	PUSH-BUTTON
3	1	71-101-009	CONTACT
4	1	71-101-028	TRIGGER MICROSWITCH
5	4	Z600-02-000	WASHER
6	4	Z220-02-010	SCREW
7	1	71-101-027	CORD GRIP
8	1	71-102-030	CABLE TERMINATOR
9	1	71-102-029	CABLE DOWEL
10	1	71-101-033	CONTROL CABLE SLEEVE
11	1	71-101-042	FERRULE
12	1	71-101-034	WELD CABLE SLEEVE



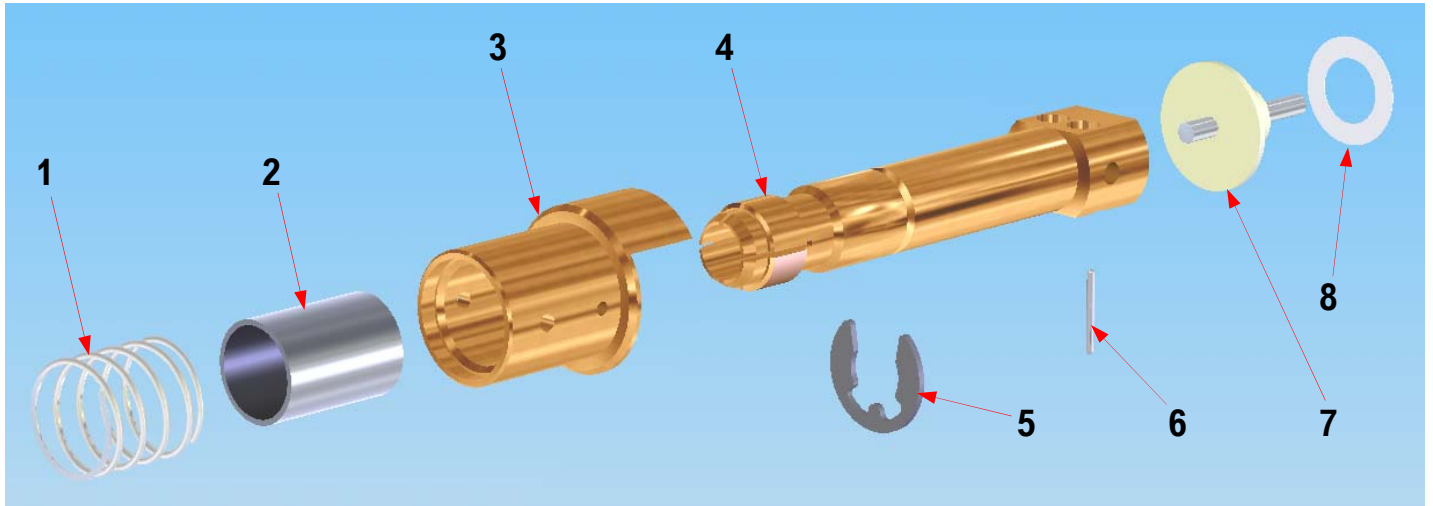
DA8 EXPLOSION



ITEM	No. OFF	PART No.	DESCRIPTION
1	2	Z100-03-005	SCREW
2	2	Z410-05-008	GRUB SCREW
3	1	71-102-056	SOLENOID COIL
4	1	71-102-064	COIL MOUNTING CUP
5	2	81-101-082	DETENT BALL
6	1	71-102-068	LINER SLEEVE
7	2	71-101041	FERRULE
8	1	71-102-075	INDICATOR PIN
9	1	71-102-065	COIL ADJUSTER
10	1	71-102-073	DETENT SPRING
11	1	71-102-066	REAR BUSH
12	1	71-102-058	BRAID ASSEMBLY



DA8 EXPLOSION

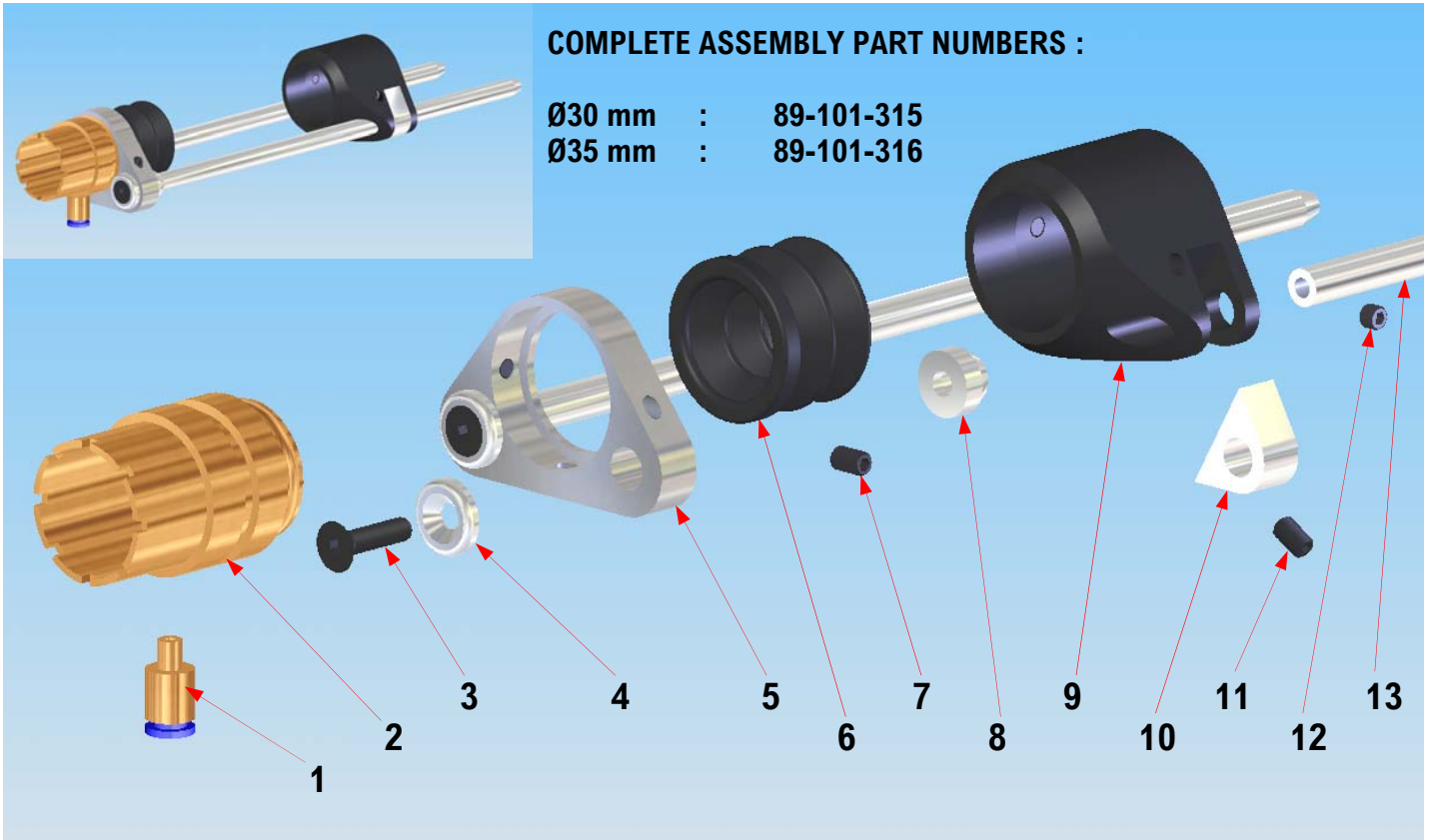


NOTE! ITEMS 7 & 8 CAN ONLY BE OBTAINED AS PART OF THE SOLENOID COIL 71-102-056 (SEE PREVIOUS PAGE ITEM 3).

ITEM	No. OFF	PART No.	DESCRIPTION
1	1	71-102-074	SPRING
2	1	71-102-071	BEARING BUSH
3	1	71-102-062	BEARING HOUSING
4	1	71-102-061	WELD SHAFT
5	1	71-101-011	CIRCLIP
6	1	71-102-015	SPIROLL PIN
7	1	SEE NOTE	POLE PIECE
8	1	SEE NOTE	HYSTERESIS WASHER



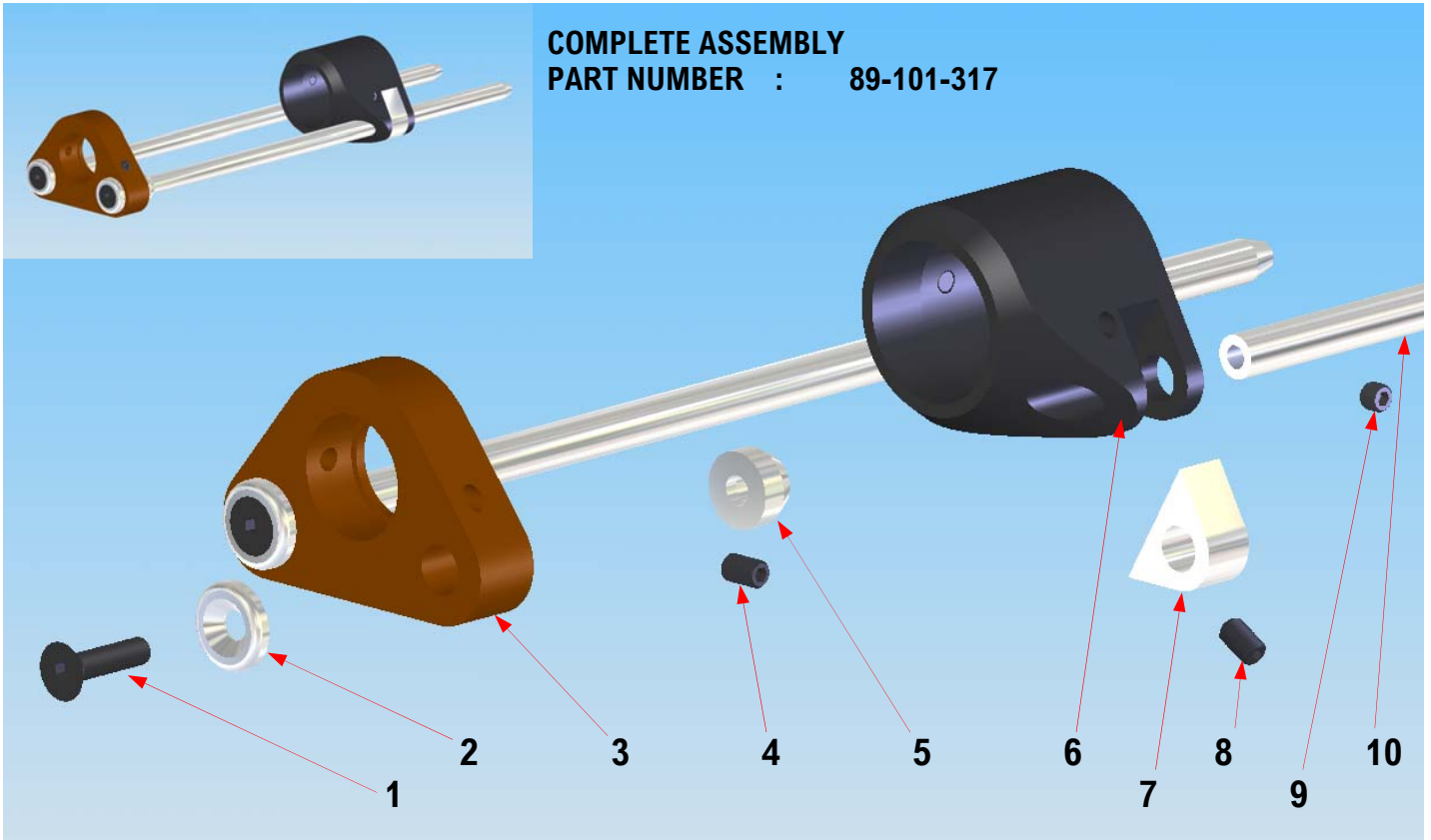
ACCESSORIES - DA8



ITEM	No. OFF	PART No.	DESCRIPTION
1	1	KQH06-M5	PIPE FITTING
2	1	89-101-268	Ø30 mm GAS NOSE CONE
or	1	89-101-269	Ø35 mm GAS NOSE CONE
3	2	Z120-05-025	SCREW
4	2	81-101-003	FOOT WASHER - FRONT
5	1	89-101-251	FOOT ADAPTOR
6	1	89-101-243	GAS RETENTION BELLOWS - Ø7
or	1	89-101-244	GAS RETENTION BELLOWS - Ø10
7	2	Z420-05-006	GRUB SCREW
8	2	81-101-001	FOOT WASHER - REAR
9	1	79-101-141	FRONT END CAP
10	2	79-101-142	PIVOTAL GRIP INSERT
11	2	Z400-05-006	GRUB SCREW
12	2	Z400-05-004	GRUB SCREW
13	2	81-101-004	LEG



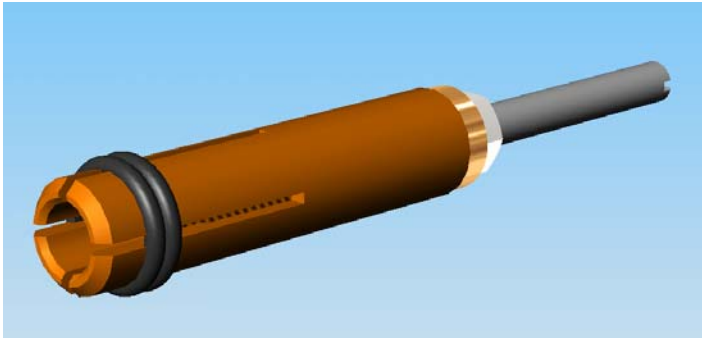
ACCESSORIES - DA8



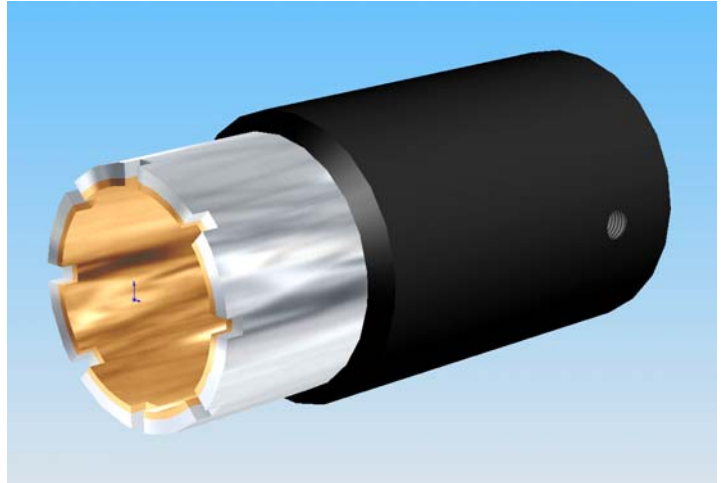
ITEM	No. OFF	PART No.	DESCRIPTION
1	2	Z120-05-025	SCREW
2	2	81-101-003	FOOT WASHER - FRONT
3	1	89-101-253	FOOT ADAPTOR
4	2	Z420-05-006	GRUB SCREW
5	2	81-101-001	FOOT WASHER - REAR
6	1	79-101-141	FRONT END CAP
7	2	79-101-142	PIVOTAL GRIP INSERT
8	2	Z400-05-006	GRUB SCREW
9	2	Z400-05-004	GRUB SCREW
10	2	81-101-004	LEG



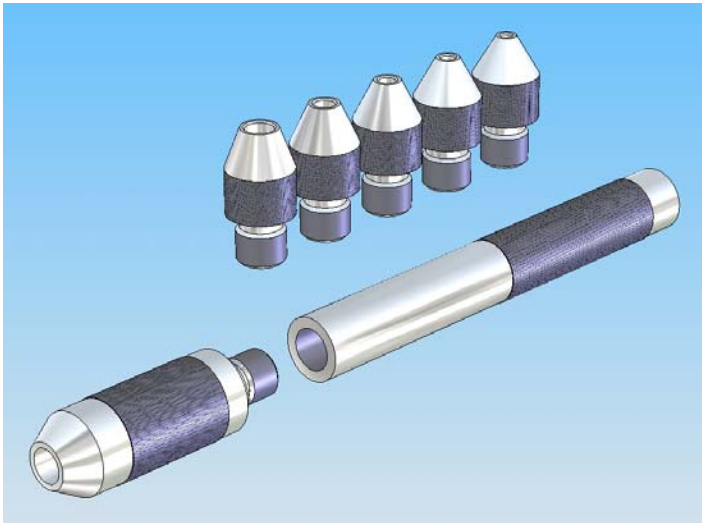
ACCESSORIES - DA8



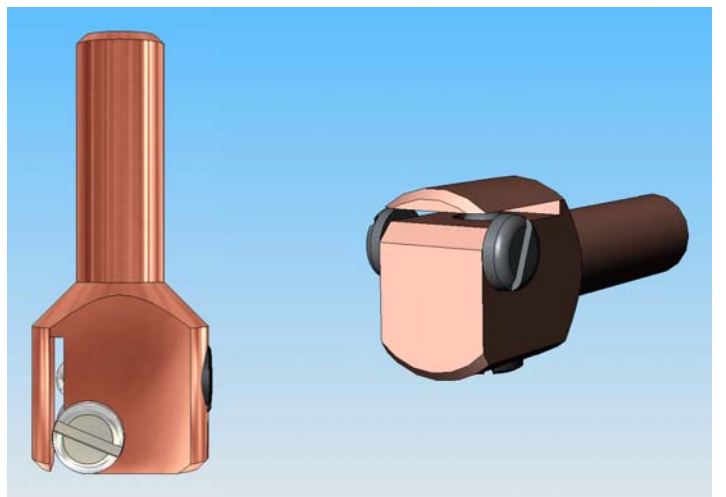
CHUCK SIZE	PART NUMBER
Ø3 mm	79-101-003
Ø4 mm	79-101-004
Ø5 mm	79-101-005
Ø6 mm	79-101-006
Ø7.1 mm	79-101-007
Ø8 mm	79-101-008



ONE PIECE GAS CONE	PART NUMBER
Ø25 mm	89-101-536
Ø30 mm	89-101-530
Ø35 mm	89-101-535



ITEM	PART NUMBER
BENDING BAR	79-101-121
M3 NOZZLE	79-101-123
M4 NOZZLE	79-101-124
M5 NOZZLE	79-101-125
M6 NOZZLE	79-101-126
M8 NOZZLE	79-101-127
M10 NOZZLE	79-101-128
COMPLETE SET	79-101-120

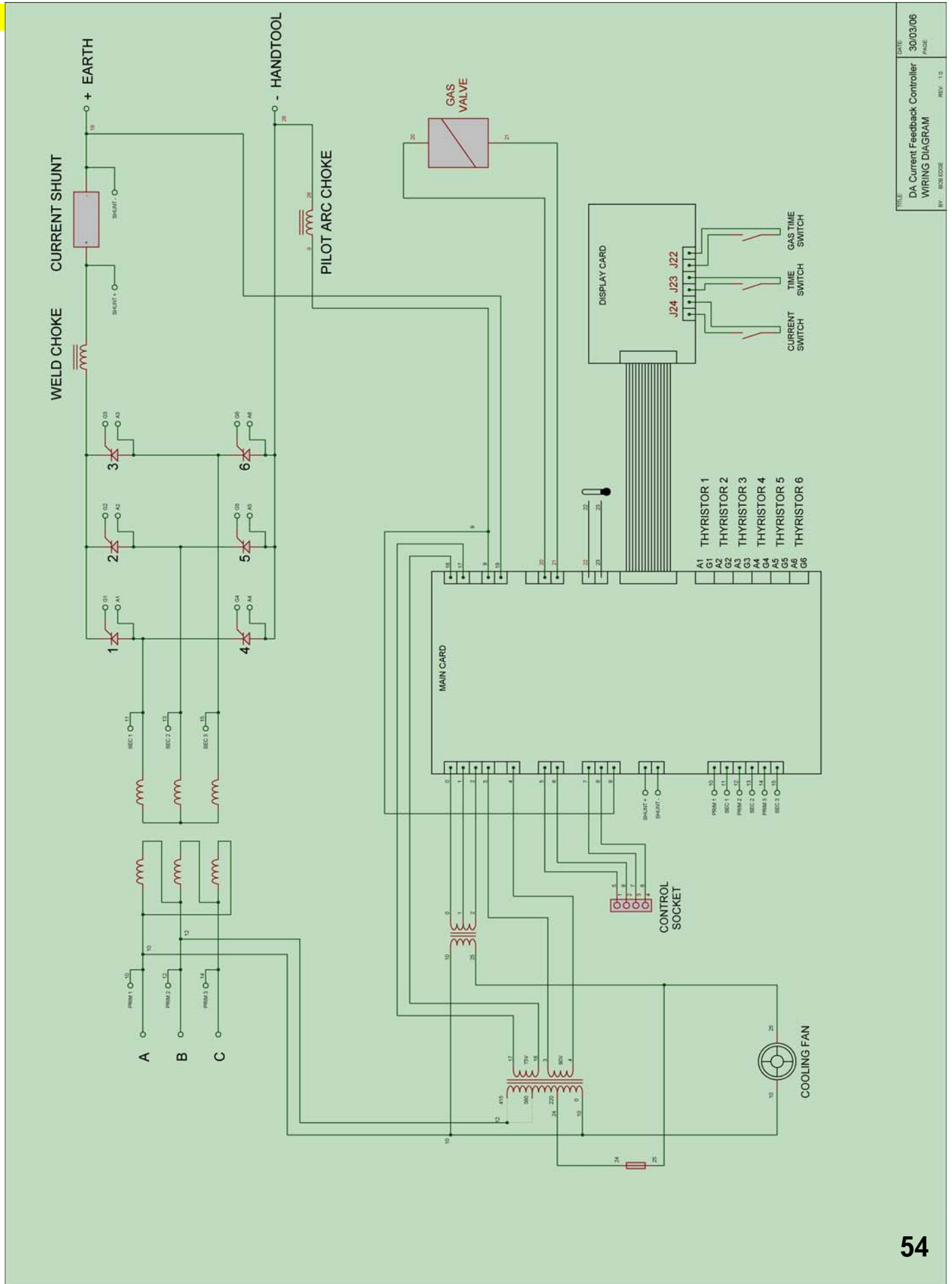


LARGE BRACKET CHUCK	79-101-231
EARTH TAG CHUCK	79-101-019

PLEASE NOTE. MANY OTHER CHUCK SIZES ARE AVAILABLE. PLEASE CHECK WITH US IF THE SIZE YOU WANT IS NOT LISTED HERE.



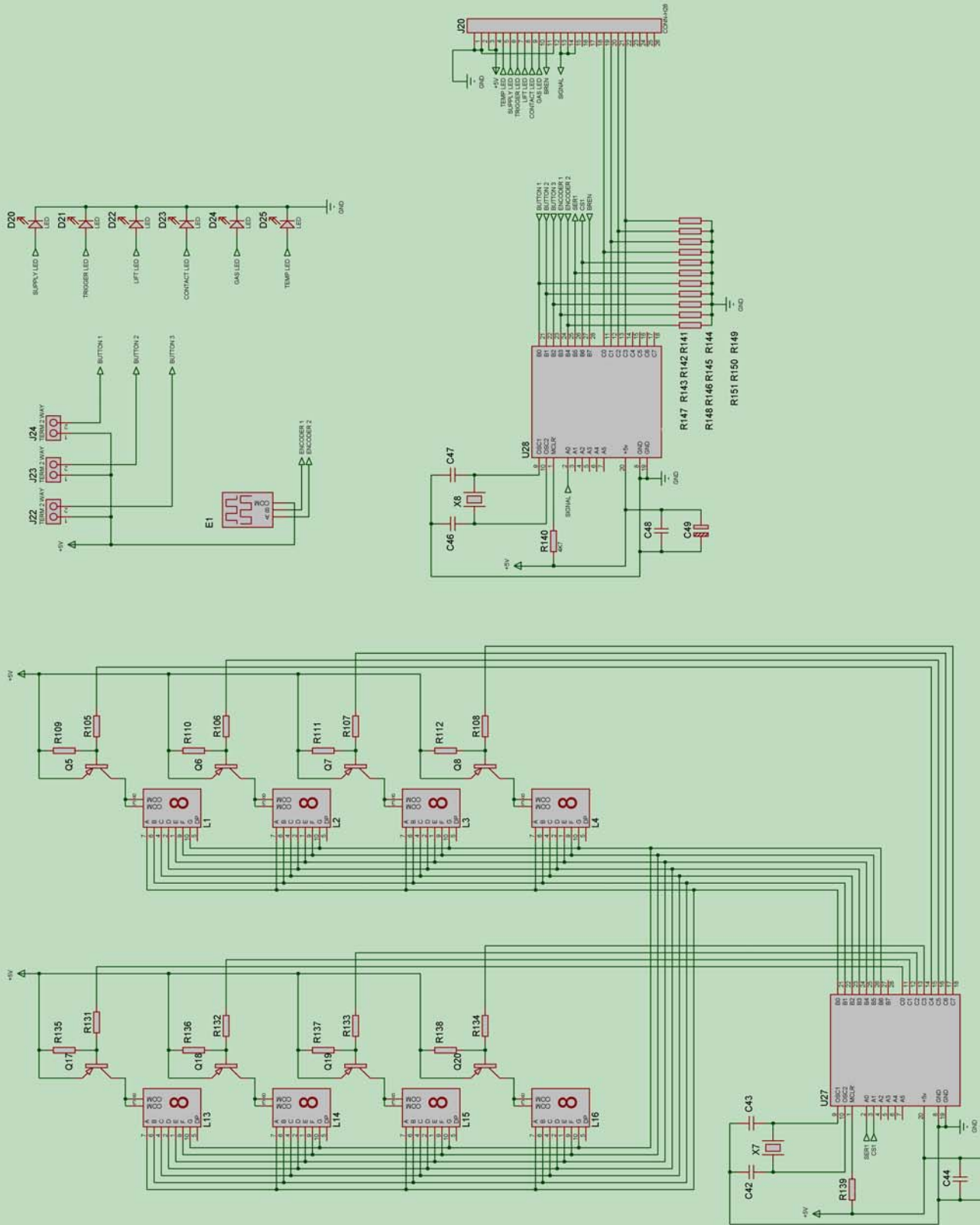
MAIN CIRCUIT SCHEMATIC



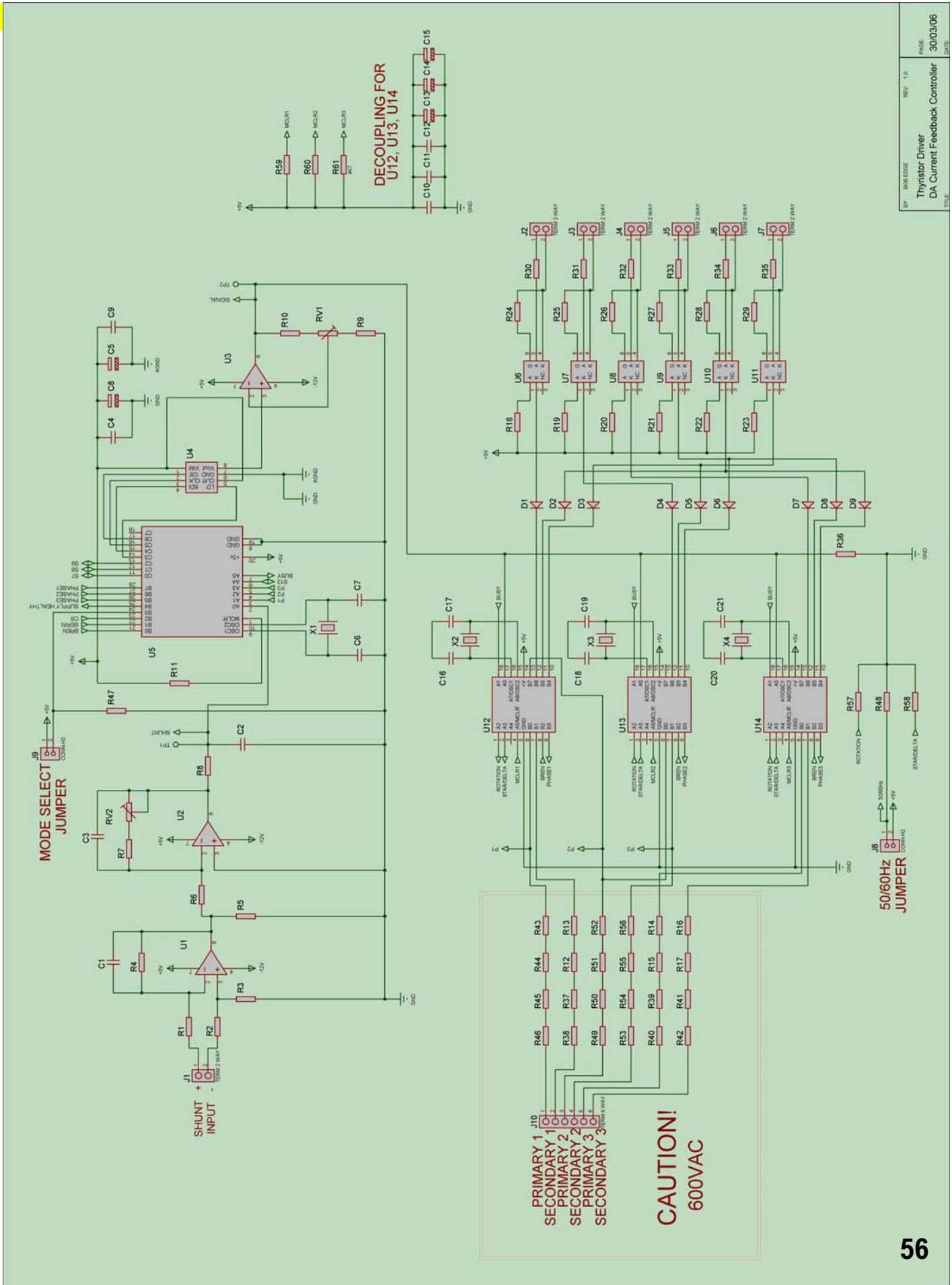
FILE: DA Current Feedback Controller
 WIRING DIAGRAM
 BY: BOB EDGE
 REV: 1.0

DATE: 30/03/06
 PAGE:

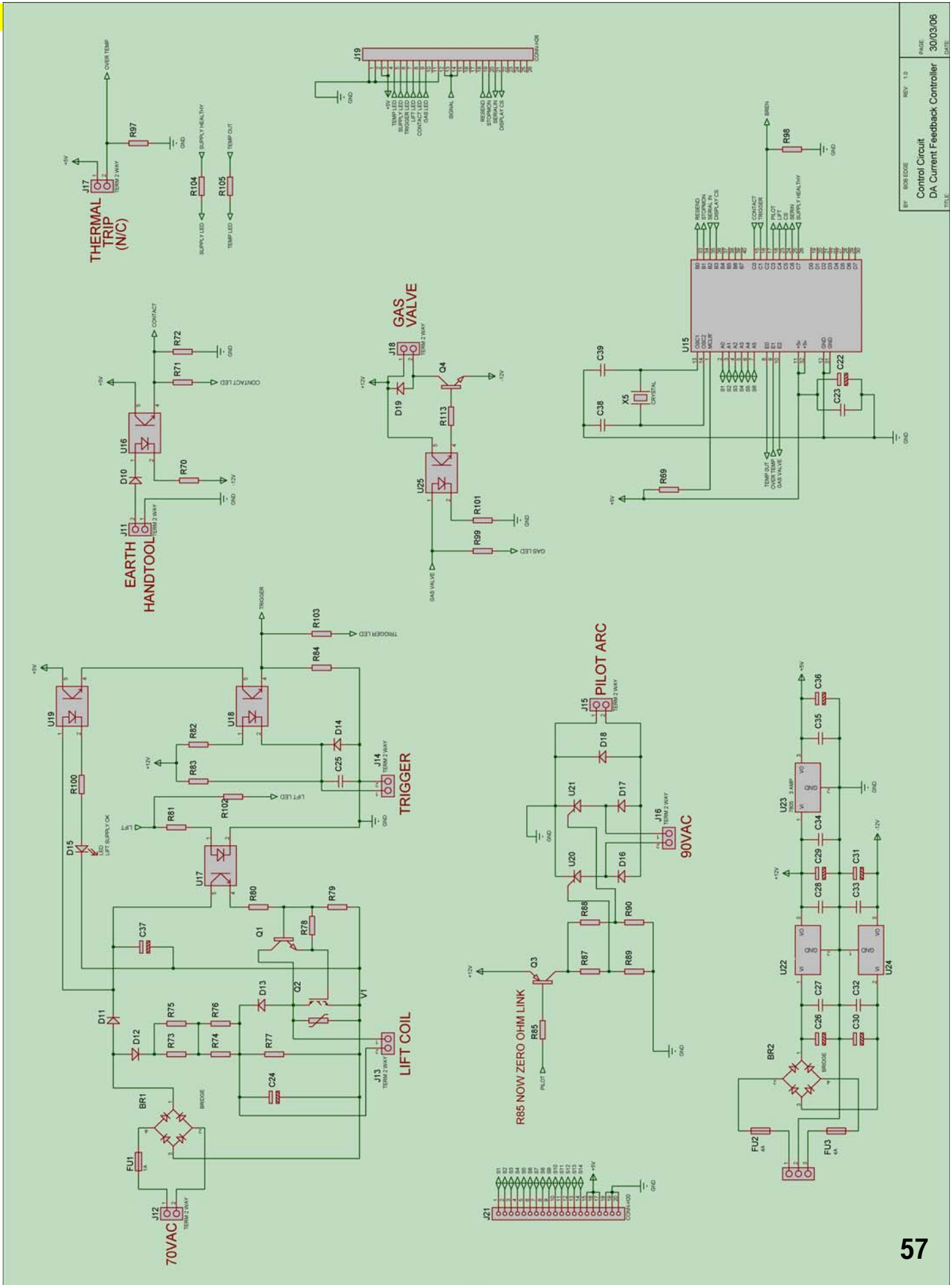
DISPLAY PCB SCHEMATIC



MAIN PCB SCHEMATIC PT1



MAIN PCB SCHEMATIC PT2



REV 1.0
 PAGE 30/03/06
 TITLE Control Circuit DA Current Feedback Controller

EC DECLARATION

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FAX : +44 (0)1924 430059
EMAIL : sales@taylor-studwelding.com

STATEMENT : This is to certify that the machinery listed below is designed and manufactured in conformance with all applicable health and safety regulations.

This statement is invalid if any modifications are carried out on the machinery without the prior written approval of Taylor Studwelding Systems Ltd.

DESCRIPTION OF MACHINE : Drawn Arc Studwelding Equipment
TYPE : 1200EDA
PART NUMBER : 99-102-030

Applicable EC guidelines and corresponding standards:

- Low voltage guideline 73/23/EEC:
EN60204-1 Safety of machinery - Electrical equipment of machines.
- EMC guidelines 89/336/EEC (electromagnetic compatibility):
EN50081 Electromagnetic compatibility - Generic emission standard
EN50082 Electromagnetic compatibility - Generic immunity standard
EN50199 Electromagnetic compatibility (EMC) Product standard for Arc welding equipment
- Machine guidelines 89/392/EEC
EN60974-1 Arc welding equipment : Electromagnetic compatibility (EMC) requirements

SIGNED



DAVID TAYLOR
MANAGING DIRECTOR

